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PENNSYLVANIA DEPARTMENT OF AGRICULTURE

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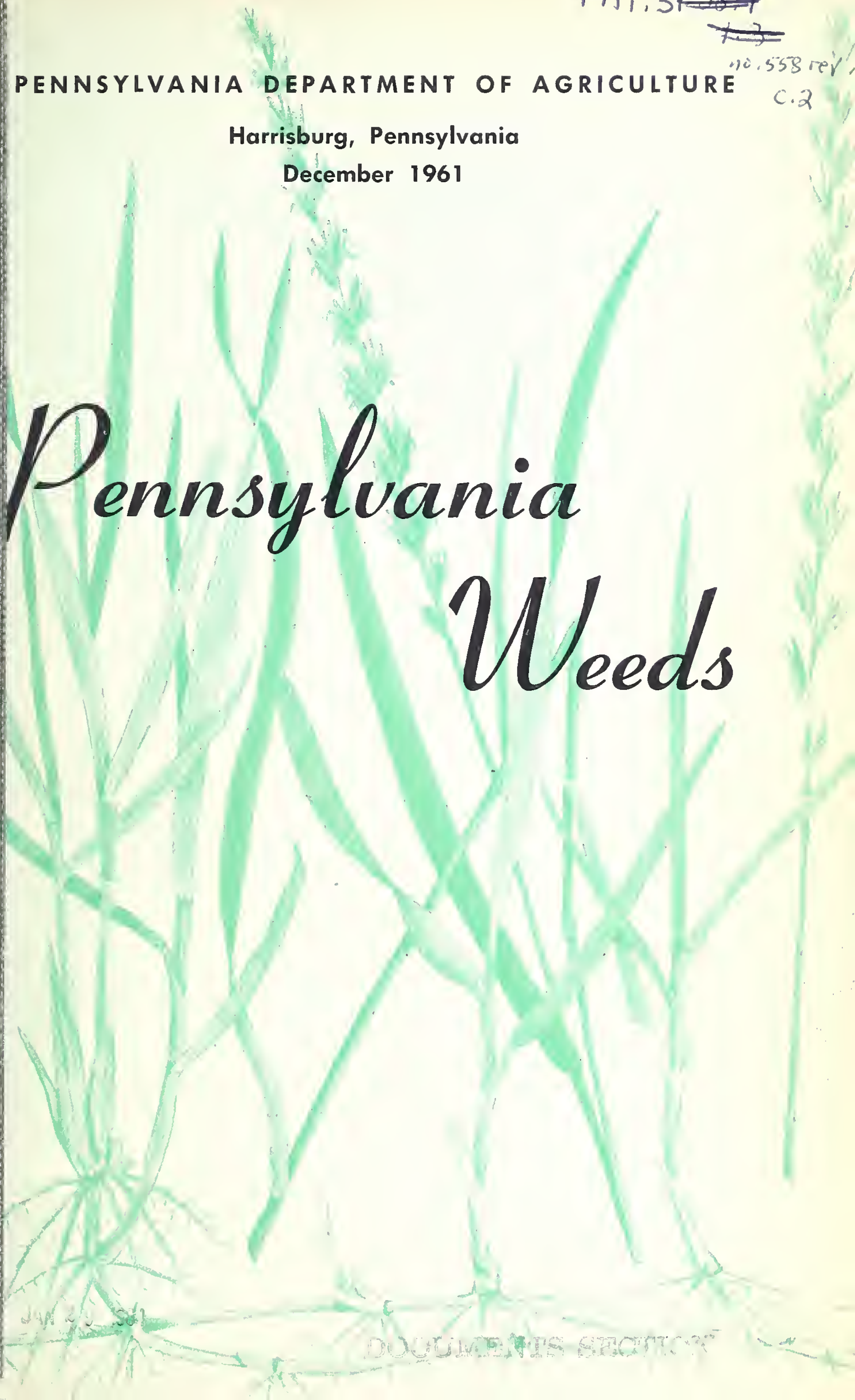

Pennsylvania Weeds

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Pennsylvania Weeds

by

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Botanist

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What Is a Weed?

A weed is a plant that is growing where it is desired that something else shall grow. It follows that a plant may be a weed in some places and not in others.

One of the oldest problems in agriculture is that of the control of weeds. It is as old as agriculture itself, for as long as man has been endeavoring to earn his living from the soil he has had to contend with weeds. They are natural enemies just as much as insects and diseases, yet man takes them for granted and has permitted them to exact enormous tolls from his agricultural efforts.

Each weed has its own way of winning in its struggle with the farmers' crops or your lawn, and its growth habits must be learned in order to know how to control it. The farmer should know the weeds on his land, and any new one should be viewed with suspicion and its identity determined at once.

This bulletin will endeavor to help you get acquainted with some of the more serious weeds in Pennsylvania. The weeds listed in this bulletin are broken down in four groups: prohibited and noxious weeds, as listed in the Pennsylvania Seed Act; the most common weeds on the farm; lawn weeds; and skin irritants.

How Weeds Cause Loss

Pests of all kinds are troublesome, but noxious weeds, as well as others, cause more losses than most farmers imagine. The farmer of today may be likened unto the man of the parable who "sowed good seed in his field, and while men slept his enemy came and sowed tares among the wheat, and went his way."

It is estimated that losses from weeds alone in the United States cost the farmer annually from three to five billions of dollars.

Let us ask the question: just how do weeds cause loss?

Weeds increase labor in the preparation of soil for planting, in cultivating the crops, in harvesting the crops, and in preparing produce for market.

Weeds increase wear and tear on machinery.

Weeds decrease the yield by shading and crowding out crop plants, by using moisture and food materials needed by the crop plants, and by harboring insects and plant diseases which destroy crop plants.

Weeds decrease the value of farm products by dockage on wheat and other farm products from such weeds as garlic, thistle, etc. and by preventing proper drying of grain and hay, thereby reducing quality and price.

Livestock is lost each year by poisonous and injurious weeds.

Weeds detract from the appearance of the farm and the community and thus lower the aesthetic tone of the people and the market value of the farms and homes in the neighborhood.

Classes of Weeds

Weeds are generally classified into three groups on the basis of their growth habits as annuals, biennials and perennials.

Annuals are those that live only one year. The plant grows from a seed and produces flowers and seeds the same season. The entire plant, including the root, then dies. Annuals may be divided into two classes: summer annuals and winter annuals. The summer annuals begin growth from a seed in the spring and mature in the summer or fall. The entire plant then dies. The winter annual begins growth from a seed in the fall. Only a small plant is produced before winter begins. This small plant lives over the winter and beginning growth in the spring produces flowers and seeds during the summer. It then dies.

Examples of annual weeds are: crabgrass (*Digitaria* spp.), corncockle (*Agrostemma githago* L.), wild mustard (*Brassica* spp.), dodder (*Cuscuta* spp.), bedstraw (*Galium* spp.), common chickweed (*Stellaria media* [L] Cyrillo), common ragweed (*Ambrosia artemisiifolia* L.), pigweeds (*Amaranthus* spp.), and lamb's-quarter (*Chenopodium album* L.).

Biennials are plants that live for two years. Biennial plants begin growth from the seed in the spring and produce a leafy plant which manufactures food and stores it up in the root during the first season but does not produce flowers and seeds. These roots live over winter and the next spring begin growth and produce a plant which blooms and forms seeds. After maturing, the biennial plant dies, roots and all.

Examples of biennial weeds are: wild carrot (*Daucus carota* L.), buckhorn plantain (*Plantago lanceolata* L.), and wintercress (*Barbarea vulgaris* R. Br.).

Perennials are plants that live from year to year. The stalks of many perennials die down to the ground in the fall, but the roots live from year to year producing a new stalk each season. The roots of some perennial plants penetrate the soil so deep and are so persistent that it is very difficult to eradicate them once they become well established.

Examples of perennial weeds are: quackgrass (*Agropyron repens* [L] Beauv.), garlic (*Allium* spp.), dock (*Rumex* spp.), bindweed (*Convolvulus* spp.), morning glory (*Ipomoea* spp.), horse nettle (*Solanum carolinense* L.), buckhorn plantain (*Plantago lanceolata* L.), ox-eye daisy (*Chrysanthemum leucanthemum* L.), Canada thistle (*Cirsium arvense* [L] Scop.), chicory (*Cichorium intybus* L.), dandelion (*Taraxacum officinale* Weber), perennial sowthistle (*Sonchus arvensis* L.), hawkweed (*Hieracium* spp.), Johnson grass (*Sorghum halepense* [L] Pers.), sheep sorrel (*Rumex acetosella* L.), and wintercress (*Barbarea vulgaris* R. Br.).

Weed Control—Mechanical Methods

In order to control or eradicate weeds it is necessary to understand their habits of growth and reproduction. Since annual and biennial plants produce seeds only once and then die, roots and all, it is evident that reseeding must be prevented. Any method of attack that will prevent the maturing of seeds and the introduction of seeds into the soil will control annual and biennial weeds. Allowing weeds to mature and sowing unclean seed are the two chief means by which seeds are introduced into the soil. Both of these can be, but frequently are not, controlled by the farmer.

Thorough cultivation throughout the season of such a crop as corn or potatoes will kill annual and biennial weeds. It must be remembered that viable seeds of many plants remain in the soil for several years. The germination of these seeds will produce a growth of weeds that should be destroyed before they produce a new crop of seeds.

Often the farmer, for want of time, neglects cutting weeds along fences, by roadsides, or in ditches or other waste places. These weeds grow to maturity, and by the many agencies of distribution the seeds are carried into the fields to begin a new crop of weeds and discourage the farmer in his effort to eradicate the pests.

Perennial plants are propagated by seeds and by underground parts. As with annuals and biennials, seed production and seed introduction must be prevented. In addition to this the underground part must be destroyed. This may be accomplished in two ways: by removal, and by starvation. A combination of the two ways is usually practiced.

It should be remembered that the underground organ which propagates the perennial plant, whether it be a bulb, a tuber, a fleshy root, a rootstock or some other organ, has received its supply of food from the leaves. Therefore prevention of leaf growth will cut off the food supply from the underground propagating organ.

For example, the Canada thistle grows from a deep cord-like rootstock which is almost impossible to remove completely. The food in these rootstocks has been manufactured in the leaves of the Canada thistle plant. If the leafy plant is cut off close to the ground, other plants soon grow up around the cut-off stump. These new plants are drawing on the supply of food which has been stored in the rootstock. If these new plants are allowed to grow and form new leaves, the food supply in the rootstocks will increase; but if they are cut off, the food supply will be reduced. Therefore, if the Canada thistle is cut off close to the ground at regular, short intervals so that no leaf surface may be formed, the underground part will finally die of starvation, and the pest will be eradicated. If this method is followed persistently for one season, at the most two, the Canada thistle or any other noxious weed can be exterminated.

The work must be done thoroughly with persistence and patience and without intermission until 100 per cent of the weed is eradicated. Too often the work is stopped when 80 or 90 per cent of the plant is destroyed, and in a few years the weed is as bad as ever.

Very bad patches of noxious weeds should be dug up or plowed and left in a fallow condition throughout the entire season. The patch should be kept clean of all vegetation by digging or cultivation every week, or oftener if necessary, throughout the season. Continue in this way for more than one season if necessary, or until every trace of the weed is gone.

In most cases a crop of corn, potatoes, or some other crop that permits clean cultivation throughout the season, may be raised, but the chief object is eradication of the weed, while raising of the crop is secondary. Too frequently these two objects are reversed, and the farmer wonders why the eradication of the weed was not accomplished.

Weed Control—Chemical Methods

Chemicals (herbicides) have been used in weed control for many years. Research during the past decades has brought increased knowledge and new chemicals for use in the control of weeds. At the present time, there are few weed problems in which chemicals cannot aid. The feasibility of their use depends largely upon the relative costs and benefits of the treatment, and possible injury to the crops, or other nearby crops.

There are many factors involved determining when a herbicide is effective. Plants are more susceptible to herbicide during rapid growth. Annuals are more susceptible when young, while perennials are most susceptible just before bloom. Weather conditions must be considered. Rain, during or immediately after foliage application, will usually wash off the spray. Plants growing under adequate moisture and high temperature are very susceptible, while plants grown under dry, cool conditions may be killed more slowly. The nature of the plant and soil conditions are other factors determining the use of herbicides.

Herbicides are now used on a large scale as well as for controlling small initial infestations and for cleaning up the last few plants after tillage or cropping methods have been used. The cost of preventive weed control should be charged against the total acreage endangered and not against the infested area alone.

The herbicides that are used today can be divided into two groups: selective and nonselective. The selective herbicides are chemicals which, when applied to a mixed population of plants, will severely injure or kill certain species with little or no injury to others. This type of herbicide is used in the control of weeds in crops. The nonselective herbicides are chemicals that kill all growth regardless of the species or plants.

Selective and nonselective herbicides can also be divided into two groups: those that are applied to the foliage, and those that are applied to the soil and thus come in contact with the roots.

There are also two groups of foliage application: contact and translocated. Contact sprays are ones that kill the tissue with which they come in contact. Translocated herbicides are absorbed by the foliage and are translocated to other tissues in the plant.

Many different products for the purpose of weed control can be found on the market today. Before a person uses any of these products he should know what he wants to control and then decide which herbicides will fit his purpose. Most important—be sure to follow the directions on the container!

Get Acquainted with Strange Weeds

A careful farmer is well acquainted with the weeds that grow on his farm. He may not know the scientific name or even the common name, but he knows something about its method of propagation and its general habits. He ordinarily recognizes a strange weed, but too often he pays no attention to it until it becomes an obnoxious trespasser or intruder.

As soon as a strange weed makes its appearance, the farmer should make its acquaintance. If he is unable to find out for himself any information about the plant he should send a specimen to the Department of Agriculture in Harrisburg where information on the habits, control and eradication of the plant may be obtained.

If the farmer is alert, he will then destroy the new pests on first appearance, or, if he has been careless in sowing seeds that produce a crop of noxious weeds, he will take immediate steps to eradicate the weed before it spreads.

Prevention Cheaper Than Eradication

Prevention is the best and cheapest method of weed control. Many farmers give no attention to a weed until it becomes very annoying and causes a marked financial loss.

The most noxious weeds in the State can be kept off the farm by vigilance, even if they are on a neighboring farm. Seeds of most noxious weeds are not wind-borne, but Canada thistle which is wind-borne is controlled by a Pennsylvania Law (Act 142—1939). The law provides for the destruction and the prevention of the spread of Canada thistle, chicory and marihuana. Anyone, upon written notice, can force the constable or supervisor to enforce this law.

Section 1 of this act reads in part:

> *"It shall be the duty of every person or persons, and of every copartnership, association, or corporation holding land or lands in any county or counties of this Commonwealth, either by lease or otherwise, on which any Canada thistle or . . . chicory . . . marihuana, may be growing, to cut the same so as to prevent such weeds from going to seed . . . who shall neglect or refuse to comply . . . shall forfeit and pay a fine of fifteen dollars to the treasurer of the school district. . . ."*

Section 3 reads:

> *"It shall be the duty of the supervisor or supervisors of the public roads or highways in every township or district as aforesaid, to cut and destroy in the same manner all such weeds on or along such roads, and in case of unseated or mountain lands, whenever it shall come to the knowledge of either the supervisor or constable of the existence of any such weeds thereon, it shall be his duty to notify the owner or owners, or agents of said lands in writing, giving ten days' notice, to cut and destroy the same as aforesaid, and upon*

> *failure to comply at the end of ten days, such officer or any person or persons employed by him, shall proceed in the manner herein before provided, with like fees and compensations, and if any such constable or supervisor shall neglect or refuse to perform his duties as prescribed by this act, he shall be liable to a fine of ten dollars, the same to be sued for and recovered as aforesaid, by the party or parties aggrieved or about to be injured by such neglect or refusal."*

After weeds have been introduced into a community they are easily spread from farm to farm by harvesting machines, by the exchange of hay, grain and seeds of various kinds, by careless disposal of screenings, and by manure.

Perhaps the greatest loss to the grower is caused by sowing seeds that contain weed seeds, particularly those of noxious weeds. The introductions of noxious weeds into a neighborhood can be traced in almost every case to the planting of unclean seed. Rarely will birds carry the seed long distances. Occasionally they may be carried by railroad trains, automobiles, trucks or some other less likely agent.

Losses due to impure seeds are not confined to one kind of crop. The seed laboratory of the Pennsylvania Department of Agriculture analyzed a sample of red clover seed years ago which a seed firm purchased from a farmer in southeastern Pennsylvania, and which showed more than 50 per cent weed seeds. There was also 46 per cent of buckhorn present. The farmer who sold this clover seed was quite indignant because he received less than 50 per cent of the market price for it. He did not sell his entire crop, but kept enough for himself and some of his neighbors who were willing to buy on price rather than quality.

In 1960 only 25 per cent of the red clover samples and 29 per cent of the timothy samples that were legal for sale in Pennsylvania. The 1960 Drill Box Survey on Oats showed an over-all average of only 64 per cent of the samples were legal for sale. The injury from sowing such worthless stuff cannot be determined, but the loss to the farmer is enormous.

The Pennsylvania Seed Act is helpful in the control of weeds. Its purpose is two-fold: first, to insure a supply of clean seed free from most objectionable weeds; second, to protect the honest seedsmen and farmers against the practices of careless seedsmen and farmers.

The first purpose is covered in the Seed Act which designated two classes of objectional weeds—prohibited and noxious. The prohibited weeds are: bindweed (*Convolvulus* spp.), Canada thistle (*Cirsium arvense* [L] Scop.), and quackgrass (*Agropyron* *repens* [L] Beauv.). It is unlawful to sell or offer for sale seed that contains any of these weeds. The noxious weeds are: dodder (*Cuscuta* spp.), horse nettle (*Solanum carolinense* L.), wild garlic and wild onion (*Allium* spp.), perennial sowthistle (*Sonchus arvensis* L.), bedstraw (*Galium* spp.), corncockle (*Agrostemma githago* L.), buckhorn plantain (*Plantago lanceolata* L.) and Johnson grass (*Sorghum halepense* [L] Pers.) and its crosses with other grasses, and any other grasses which produce seed which are not readily distinguished from Johnson grass. It is unlawful to sell or offer for sale seeds which contain noxious weed seeds in excess of the tolerances given in the Rules and Regulations under the Seed Act.

The second purpose is accomplished by requiring that all seeds sold for seeding purposes shall bear a tag or label giving information as to the purity, germination, and the nature and kind of impurities contained. The State Department of Agriculture is authorized to collect samples of seed offered for sale for purposes of analysis to determine whether or not the seed supply complies with the information given on the label. While this protection is made possible by the law, it is obviously impossible for the State to force the farmer or seedsmen to accept that protection. Adequate protection can result only from the closest cooperation between farmers, seed dealers and the Pennsylvania Department of Agriculture.

What should farmers do? First, buy from a reliable seed firm. Second, demand a statement of the analysis of the seed offered for sale, and do not buy unless the dealer or farmer will furnish this statement.

What should retail seedsmen do? The retail seedsman should always demand an analysis from the wholesaler. Every bag of seed should have a tag firmly attached showing the full analysis as required by the Pennsylvania Seed Act. He should keep a copy of this analysis, and, if possible, a sample of the seed. Both retailer and wholesaler within the State are responsible for any violations of the law, but if the retailer is vigilant and careful, he will not buy or accept seed from wholesalers who do not follow the practice of having seed properly tested as required by law.

Both farmers and retailers will find it to their advantage to report to the Bureau of Plant Industry, Pennsylvania Department of Agriculture, any person who fails to properly tag seed giving purity and germination, or any person who continues the practice of selling weedy seed.

FIELD BINDWEED

Convolvulus arvensis L.

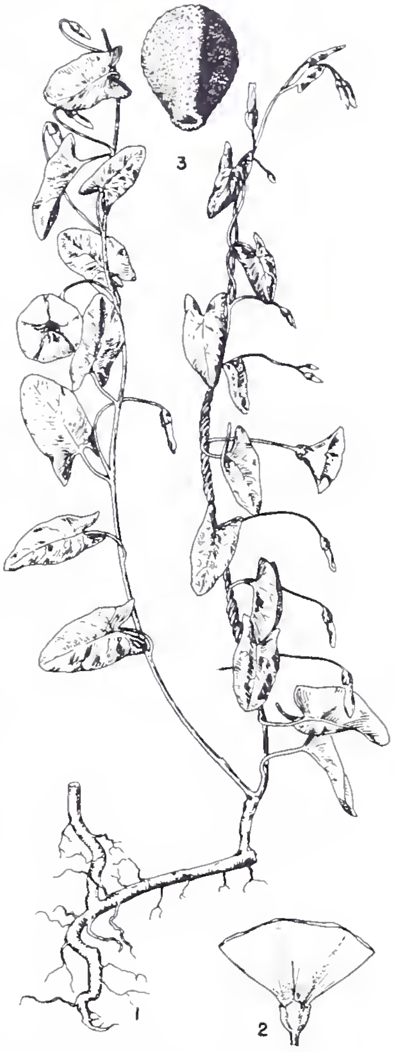

Figure 1—Field Bindweed (1) part of plant showing habit; (2) flower; (3) seed.

Field bindweed *(Figure 1)* is a native of Europe and Asia. A perennial that reproduces by seeds and rootstocks, it is found in and able to persist and spread in all non-cultivated areas and under most cropping systems. It flowers from June through the summer and produces seed from August until frost.

The roots are very extensive, sometimes growing down as far as 20 or 30 feet. If the plants are cut off during the summer near the surface, new shoots may appear in two or three days. The bindweed is a vine with smooth, slender, twining stems which spread out thickly on the ground or twine about any object within reach. Leaves are alternate, simple, petioled, quite variable in size and shape, but typically narrowly ovate with a pair of basal lobes directed backward (arrow-shaped). The flowers are about the size of a quarter, single, white or pink in color, funnel-shaped and borne in the axils of the leaves. The seeds are dark brownish-gray, rough, about one-eighth inch long, and with one rounded and two flattened sides.

Rotation of crops, early spring and later fall plowing, as well as thorough cultivation, is one good method of control. Another method would be the close pasturing of sheep or hogs, the main idea here being to keep leaf growth down and thereby starve the underground parts.

Complete coverage and repeated applications of chemicals have resulted in good control, when applied under favorable conditions.

The morning glories *(Ipomoca spp.)* are often confused with the bindweeds. Morning glories are annuals reproducing by seeds. They are also twining plants with various shaped leaves, and the flowers are funnel-shaped, ranging in color from scarlet to blue, purple and white. Control methods would be similar to that for the bindweeds.

CANADA THISTLE

Cirsium arvense (L.) Scop.

Canada thistle *(Figure 2)* is a native of Europe. A perennial that reproduces by seeds and by underground rootstocks, it can be found in all crops and in pasture and waste places throughout the state. It blooms from June to August and produces seeds from July to September.

The light yellow or nearly white roots of this plant extend several feet deep and quite some distance horizontally. They have been known to grow eighteen feet long. New plants spring from these roots at different times throughout the season. The stems are grooved, two to five feet tall, branching only at the top, slightly hairy when young and become increasingly hairy as they mature. The leaves are sessile, alternate, simple, oblong or lanceolate, irregularly lobed and spiny-toothed, hairy when young and dark green. The flower heads are about three-fourths of an inch in diameter and are compact and numerous. They are borne at the tips of stems and branches and consist of purplish disk flowers only. Male and female flowers usually occur in different heads borne on different plants. The male flowers never produce seeds.

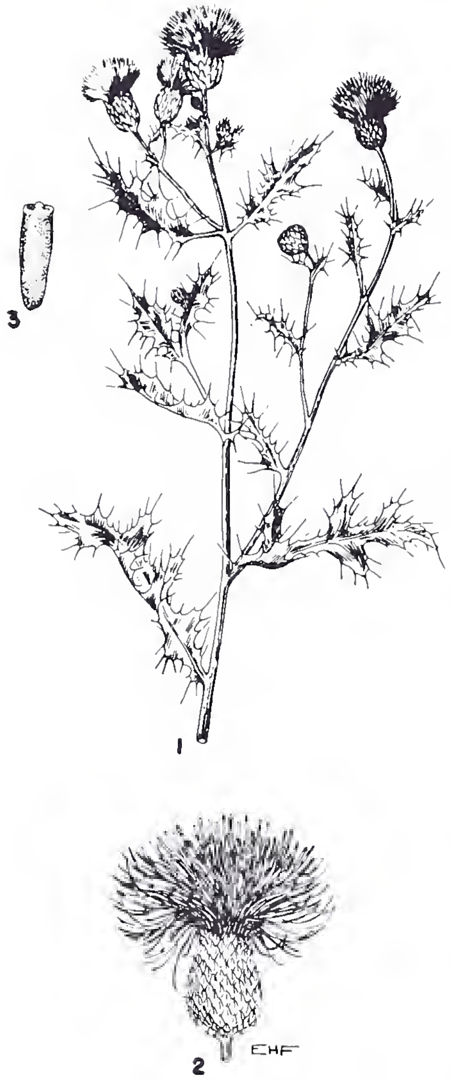

Figure 2—Canada thistle (1) portion of upper stem with flower-head; (2) flower-head; (3) seed.

The seeds are brown, smooth-coated, slightly tapered, and about one-eighth inch long. The top of the seed is nearly round, flat and indented with cone-shaped center point. Attached to the seed is a tuft of hairs which aids in their distribution by the wind. This tuft of hairs is easily broken off and therefore is not found on the seed when found in agricultural seed.

The first step in control is to prevent infestation. If infestation does occur, then seed production should be prevented. This can be done by starving the long creeping roots. Cutting, plowing, cultivation and the use of chemicals are all worthwhile practices but must be followed for a period of several years. The main point is that no seed should be permitted to mature and no green leaves allowed to grow to produce food for the roots.

QUACKGRASS

Agropyron repens (L.) Beauv.

Quackgrass *(Figure 3)* is a native of Europe and Asia. A perennial that reproduces by seeds and underground rootstocks, it is found in fields, roadsides, open waste places and most cropped areas. It blooms in June and forms seed in July.

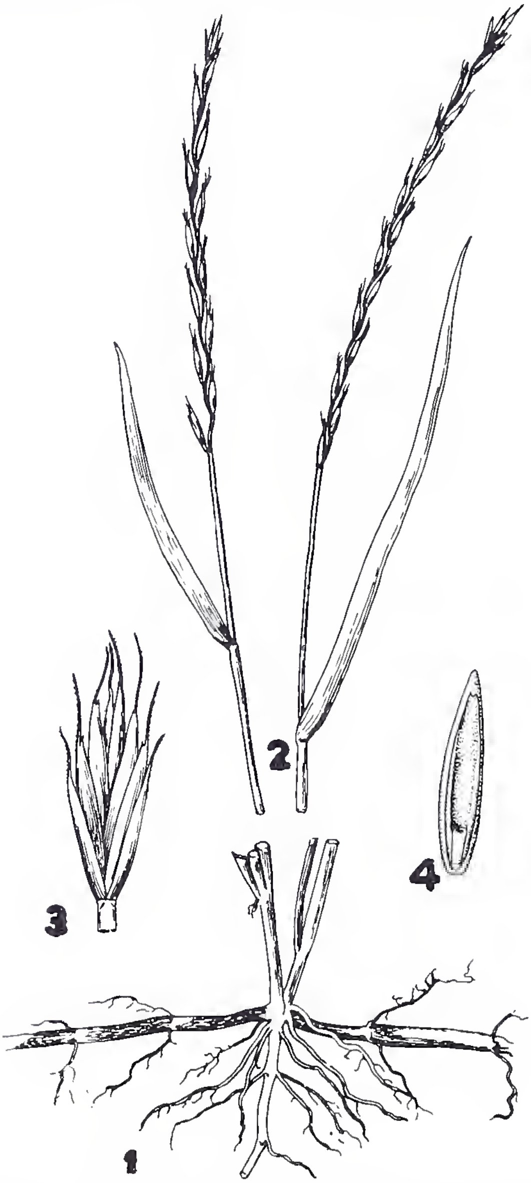

Figure 3—Quackgrass (1) base of plant with portion of scaly rootstock; (2) flower clusters and upper portion of stems; (3) group of flowers; (4) grain, inner surface.

The chief distinguishing character of this plant is the pale yellow, smooth jointed rootstocks which are about one-eighth inch in diameter and run along just beneath the surface of the ground. These rootstocks are so strong, sharp-pointed and unyielding that they have been known to push their way through potatoes. The rootstock of this plant is actually an underground stem. The leaves are typical of grasses in that they are distinctly ribbed, flat, ashy green and hairy below. The seeds are arranged flatwise to the stem, rather than edgewise as they are in ryegrasses.

Quackgrass grows in any kind of soil. In a good rich soil it will not produce many seeds but will propagate by its rootstocks. On poor or dry soils it will produce a good seed crop. If it were not for its great power of spreading and crowding out other plants, it would be useful. It makes good hay, good pasture and, on account of its matted roots, a splendid soil binder.

To control quackgrass the creeping rootstocks must be killed, and to do this the growth of leaves must be prevented. In small areas this can be done by smothering them with tar paper, boards, straw or other material. In larger areas it can be pastured with hogs, plowed and thoroughly harrowed with a spiked tooth harrow or by crop rotation and the use of special cultivating equipment. No matter what method is used, the rootstocks must be starved. There are chemicals that will help in its control.

BEDSTRAWS

Galium spp.

The bedstraws or cleavers *(Figure 4)* are natives of this country and have also been introduced from Europe and Asia. They are annuals which reproduce by seeds. They flower from May to July with seeds maturing from June to August. Bedstraws are found in open places, moist pastures, meadows, fencerows, old

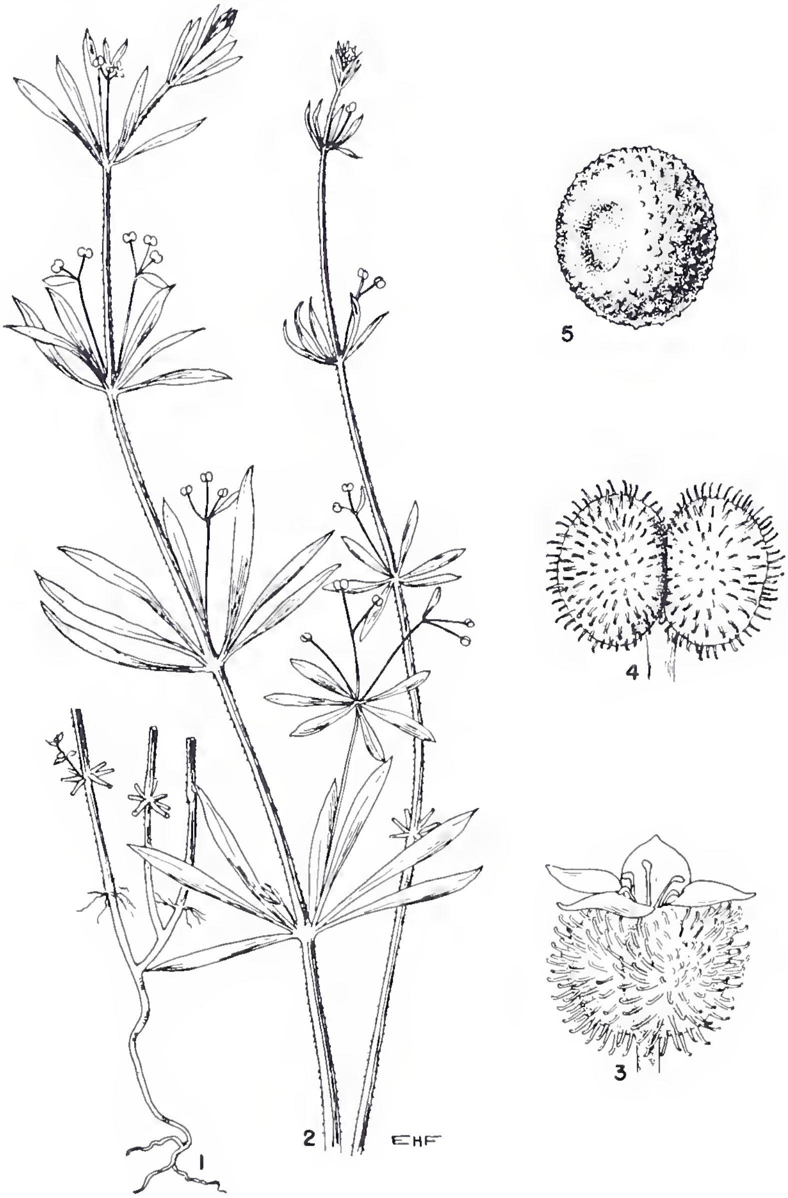

Figure 4—Bedstraw (1) lower portion of a plant; (2) upper portion of stems; (3) flower; (4) seed-pod; (5) seed.

fields and rich woods. In many cases they take over fields of clover, alfalfa and trefoil.

There are about 30 different species of *Galiums* found in the United States, and in general the plants are very similar. The roots are short and branching. The stems are usually long, weak, sprawling over the ground and four-sided, with each edge bearing a row of short, downward-pointing bristles. These bristles help the plants to cling to other plants for support. The leaves are narrow, rough, bristle-pointed, smooth-edged and in circles of six to eight at the joints of the stem. The flowers are very small, white, with four petals, borne on slender branches attached at the joints of the stem. Seeds are shaped something like a doughnut with a deep pit in the center and short sharp spines on the outer surface.

The bedstraws are not so much of a problem in fields that are continually cultivated, because the production of seed can be controlled. It is a problem in fields of trefoil, clover or pastures, and these fields should be plowed and cropped for several seasons before replanting to pasture or other forage crops. Chemicals can be used with certain crops.

CORN COCKLE

Agrostemma githago L.

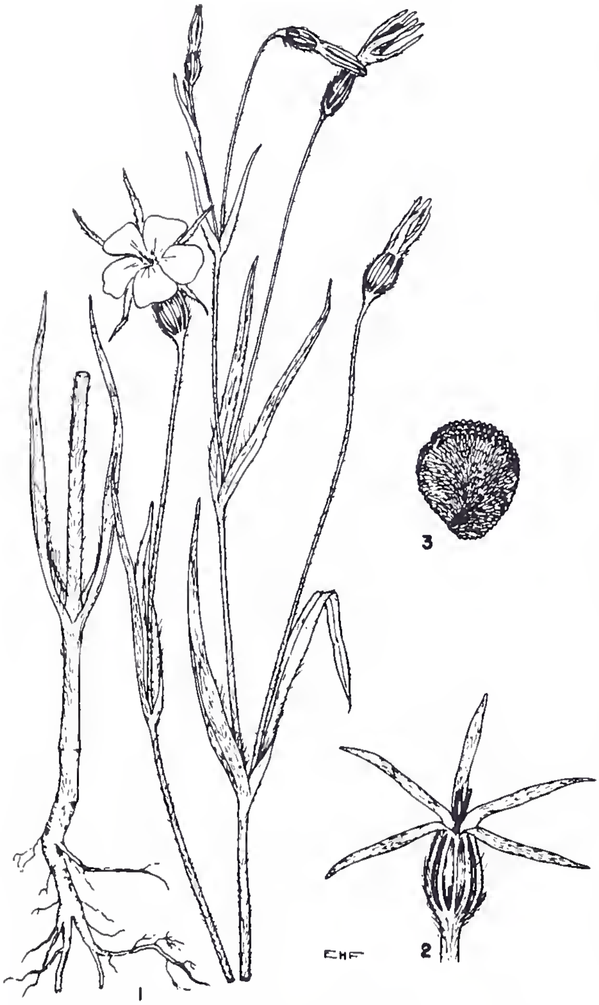

Figure 5—Corn cockle (1) portion of the plant showing general habit, roots, leaves, and flowers; (2) seed-pod; (3) seeds.

Cockle *(Figure 5)* is a weed known by every farmer in Pennsylvania who has had any experience in the raising of wheat. It is primarily a weed of grain fields, and as one writer has put it, "It is there because it is sown there." The seeds of cockle are poisonous, and when ground with wheat the flour is rendered unwholesome, and even dangerous, as food. Poultry and other animals have been killed when fed screenings containing large amounts of corn cockle.

Corn cockle is a native of Europe and Asia and is an annual that reproduces by seeds. It flowers in late May and July, and the seeds ripen in July and August.

The stem is hairy with swollen nodes about one to three feet high, branching some at the top. The plant has a fibrous root system. The leaves are opposite, simple and silky. The flowers are pink to lavender, about ¾ inch wide, with long pointed sepals which are longer than the petals. The fruit is a capsule containing several seeds which are 2-3mm. in diameter, triangular, rounded on the back, black and covered with rows of pointed tubercles.

Planting pure crop seed is the best prevention. Scattered plants in grain fields should be pulled before seeds are formed. Chemicals can be used as a means of control. Some seeds may live in the ground for years; therefore, the prevention of seed formation must be carried on for several years.

DODDER

Cuscuta spp.

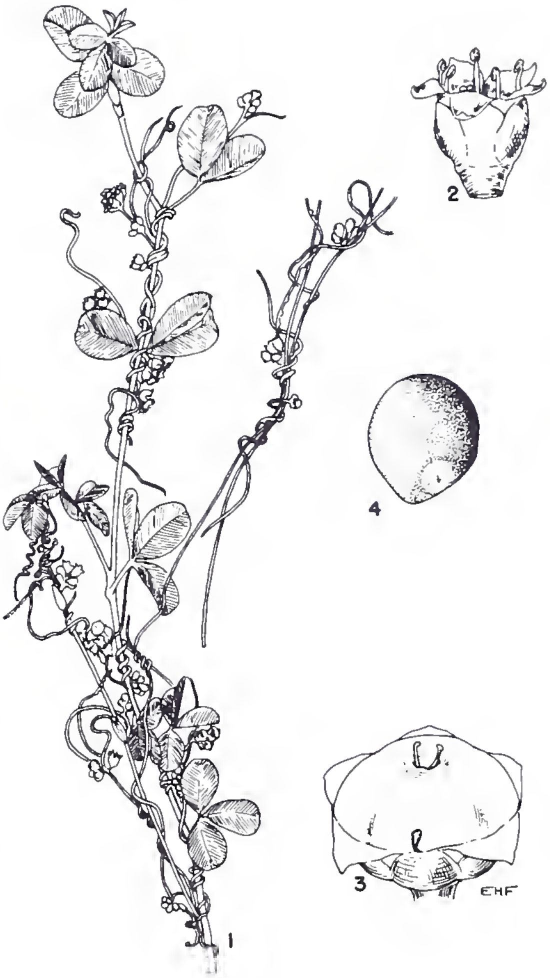

Figure 6—Dodder (1) portion of a plant growing on a host; (2) flower; (3) seedpod; (4) seed.

There are about fifty species of dodder *(Figure 6)* found in America, but the ones which most concern Pennsylvania farmers are those that live on clover and alfalfa. Dodder, a native of America, Europe and Asia, is an annual that reproduces by seed. It blooms from July to September and fruit are found from August to October. Dodder is a twining parasitic plant. The germinating seed gives rise to slender, yellowish shoot which twines about the host plant. The soil roots soon die, after tiny roots grow into the stem and supply nourishment until the host plant dies. The dodder plant does not die but reaches out and becomes attached to a new host. Viewed from a distance, a heavy infestation of dodder gives the impression of a hairy mass of webbing covering the plants of the area. There are no true leaves, but there may be small branches present. The numerous small white flowers are borne in clusters. The seeds are smooth or slightly rough, nearly globular or angular, with one or more flat surfaces.

In order to control dodder, seed containing it should not be sown. If a field contains dodder it should be mowed before seeds can be produced. If the seeds have matured the hay should not be used as feed, because the mature seeds can pass unharmed through the digestive tracts of animals. Then, by using the manure, the seeds will be spread to uninfested fields. Dodder can be controlled by the use of chemicals.

WILD GARLIC

Allium spp.

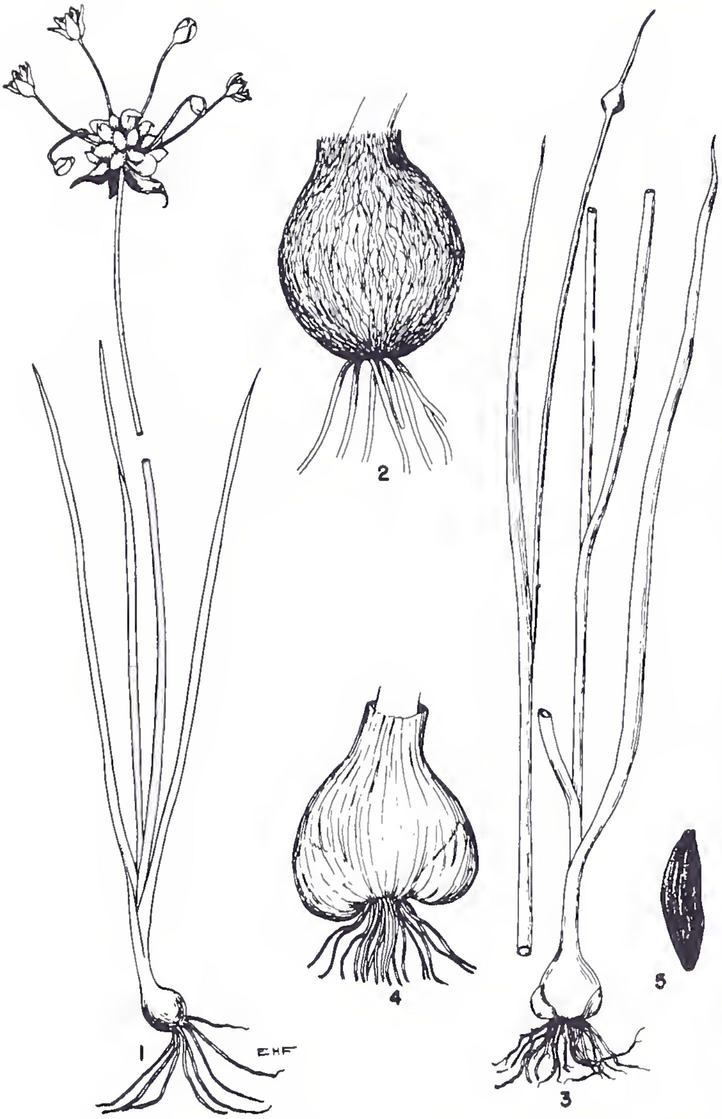

Figure 7—Wild onion (1) portion of whole plant, showing habit; (2) bulb covered with fibrous coat. Wild garlic (3) lower and upper portions of the plant; (4) bulb and bulblets; (5) seeds.

Wild garlic *(Figure 7)* is a native of Europe, a perennial that reproduces from aerial bulblets, underground bulblets and rarely from seeds. It blooms from late May to June, and the aerial bulblets ripen at about the same time as winter wheat and rye and are harvested with them. It can be found in fields, pastures, meadows and lawns.

The stems are slender, the lower half covered with the sheathing leaf bases. There are two types of bulbs; soft ones which germinate the first fall, and the hard ones which overwinter before germination or lie dormant for two or three years. The leaves are slender, hollow, grooved above and often numerous. Clustered at the top of the slender flowering stalk are small pinkish-purple flowers, often nearly white, on threadlike stalks. As the flowers wither aerial bulblets about the size of kernels of wheat take their places. These aerial bulblets sprout in the late summer forming weak plants during the early fall.

Cultural control, consisting of late fall plowing and early spring plowing with a cultivated crop during the growing season, appears to be an effective control. Chemicals are also used as a means of control.

WILD ONION

Allium spp.

Wild onion *(Figure 7)* is a native of America that reproduces by aerial bulblets and occasionally by seeds. It blooms from May to June, and the aerial bulblets ripen in July and August.

This plant is similar to wild garlic but does not produce underground bulblets at the base of the old bulb. The aerial bulblets are also larger.

The following is a comparison of the two alliums:

	Wild Garlic	*Wild Onion*
Leaves		
Forms	Cylindrical	Flat
Base	Sometimes above ground on stem	At ground level out of bulb
Bulbs (underground)		
Number	Clusters at base of each plant	One at base of each plant
Covering	Fibrous	Netlike
Kind	Hard-shelled (brown) and soft-shelled	All soft-shelled
Flavor and odor	Strong	Moderate

Control measures would be the same as for wild garlic.

HORSE NETTLE

Solanum carolinense L.

Horse nettle *(Figure 8)* is a native of America. It is a perennial that reproduces by seeds and rootstocks. These rootstocks have been known to live for ten years under a pile of sawdust and grow when the sawdust was removed. It can be found in meadows, pastures, fields, gardens and waste areas, especially those

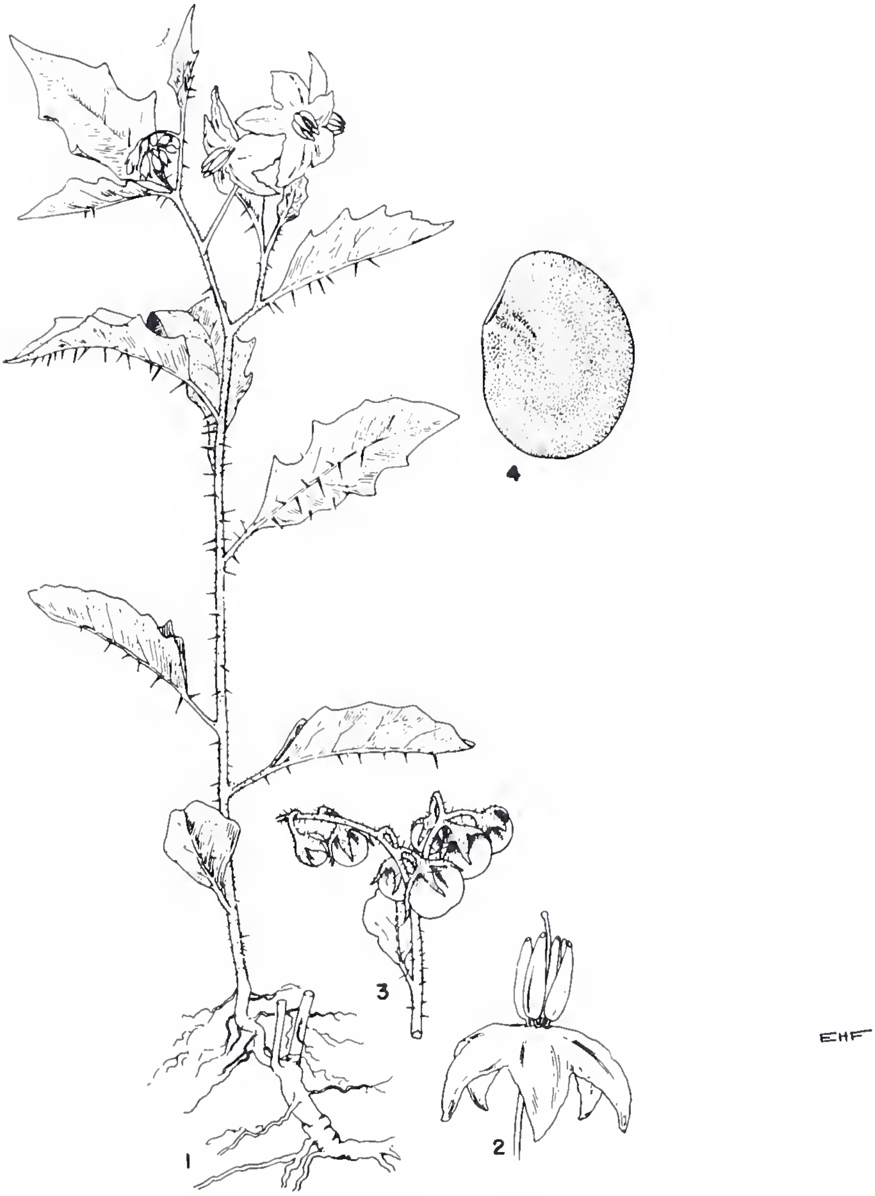

Figure 8—Horse-nettle (1) portion of plant showing habit; (2) flower; (3) cluster of berries; (4) seed.

with sandy soils. The plant blooms from May to September and forms mature seed from about July to November.

Horse nettle belongs to the potato family. The leaf, the white or light blue flower and the fruit resemble somewhat that of a potato plant or a small tomato. The marked distinction of the plant is the stout, sharp yellowish prickles found on the stems and veins of the leaf; also, the rootstocks and the seed balls which are smooth, yellow and from one-half to three-fourths inch in diameter when ripe. The seeds in these balls are straw-colored, flat, round or egg-shaped and about one-tenth inch long.

The description of the weed indicates clearly why it is undesirable in any field. Sheep are the only grazing animals that will touch the plant and they merely nibble off the fruits. Since the seeds become widely scattered through their droppings, this should be ruled out as a control measure. To destroy horse nettle, the roots must be starved. The plant, when in pasture, must be kept cut low allowing no leaves to grow. In cultivated fields plant two tilled crops such as corn or potatoes. Plant in check rows if possible so that the field may be cross-cultivated. Keep the plant down during the entire season, even after cultivation stops. Remember that the primary object is to get rid of horse nettle, while raising a crop is secondary. Follow this procedure until the weed has been starved out. Chemicals can be used as an aid in its control.

JOHNSON GRASS

Sorghum halepense (L) Pers.

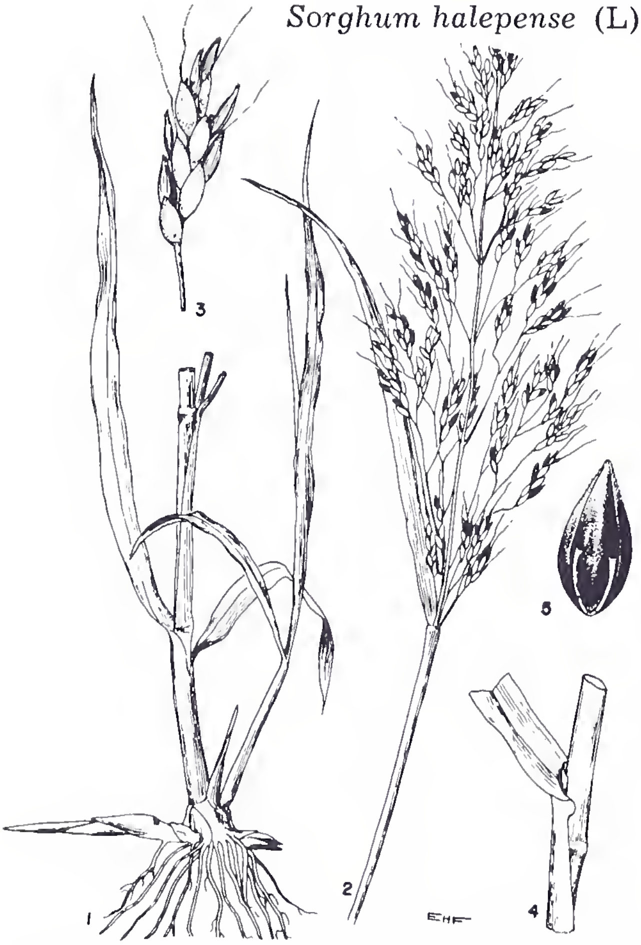

Figure 9—Johnson grass (1) base of plant showing stout stems, roots and a short, scaly rootstock; (2) flower cluster; (3) group of spikelets; (4) section of stem showing base of leaf; (5) seed.

Johnson grass *(Figure 9)* is a perennial from Southern Europe and Asia. It reproduces by seeds and rootstocks. The plant blooms from early June to July, and seed ripens from July to September. The plant can be found in rich soil as in overflow stream bottoms, and in meadows and waste places.

The erect stout-growing stems, which may reach a height of six feet, arise from a freely branching, stout, rhizome-possessing, fibrous root system. The smooth, flat leaves are a foot or more long and about one inch wide, with smooth sheaths. The purplish flowers are borne in a large, branching, terminal cluster. The seed is nearly ⅛ inch long, oval, reddish-brown, marked with fine lines on the surface, and bearing a conspicuous awn which is easily broken off.

This plant is closely related to the several cultivated varieties of Sorghum, including Sudan grass and Sorghum cane. Johnson grass may easily be distinguished from these by its long scaly rootstock.

This is a difficult weed to control in land that is kept under crop production. The broken rootstocks can be scattered in working the land, and new areas of infestation can be started. Continued cultivation, close mowing or grazing will force the rootstocks near the surface, and there is a chance they may freeze in a cold winter. There are some chemicals that will aid in its control.

WILD MUSTARDS

Brassica spp.

There are many varieties of weeds grouped in the Mustard family. *(Figure 10)* Some of these are very troublesome. Farmers are mostly concerned with the weedy *Brassica* spp. such as charlock *(Brassica arvensis)* and black mustard *(Brassica nigra)*. Most of these plants are natives of Europe and are annuals that reproduce by seed.

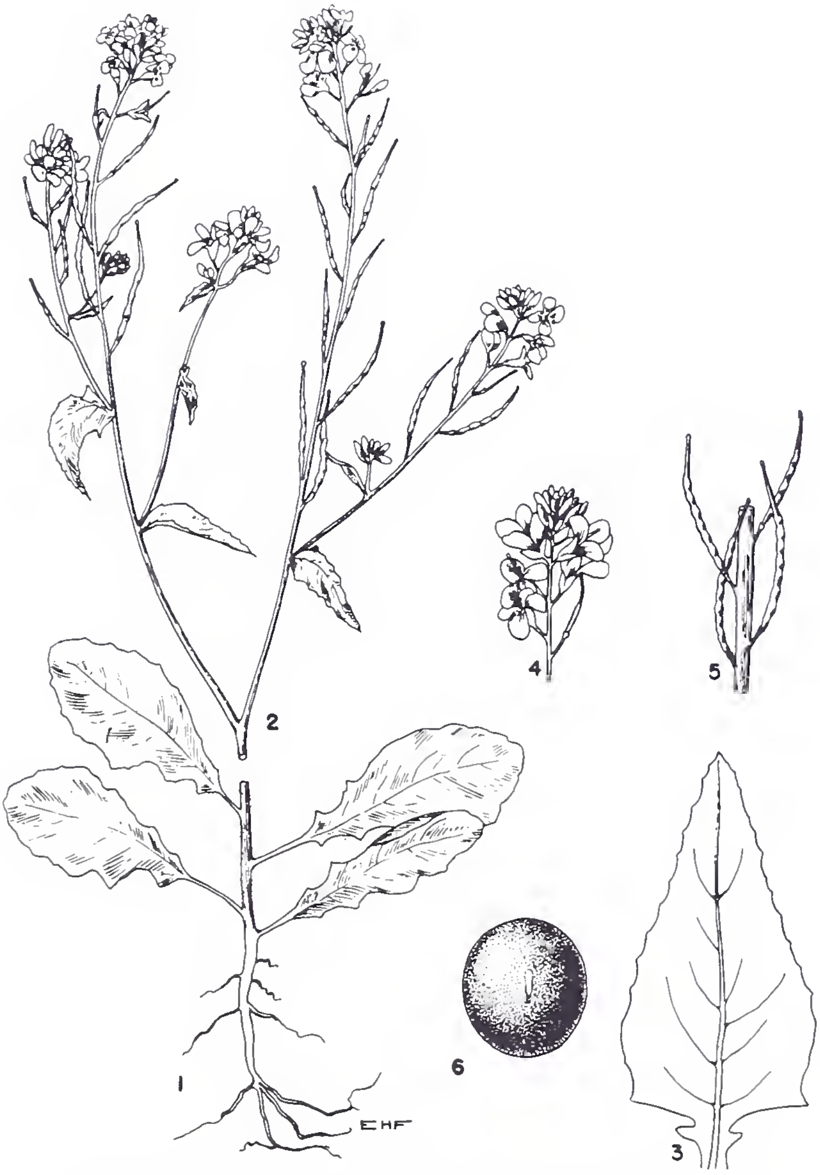

Figure 10—Wild mustard (1) lower part of stem with tap root; (2) stem with flowers and seed-pods; (3) leaf from upper part of stem; (4) part of flower cluster; (5) mature seed-pod; (6) seed.

The root is a straight tap root. The stems are upright, branched more or less according to where grown, and usually hairy on the lower portions. The leaves are short, petioled and slightly cut in on the edges. The general outlines vary. The lower leaves are similar to those of a turnip or radish, and the upper ones are without a petiole and not deeply notched. The flowers are yellow, borne in finger-like clusters. Seed pods are smooth, the upper third a solid, two-edged beak, spreading out from the stem or short stalks. The seeds are nearly spherical, about 1/16 inch in diameter, black or dark brown, the outer coat either finely net-like in appearance or smooth. It is difficult to tell the difference between seeds of the different *Brassica* spp.

Since all these plants are annuals, the main concern in control is to keep the plants from producing seeds. Seeds of black mustard have been known to germinate after being buried in the ground for twenty-five years. Chemicals can be used for their control.

BUCKHORN PLANTAIN

Plantago lanceolata L.

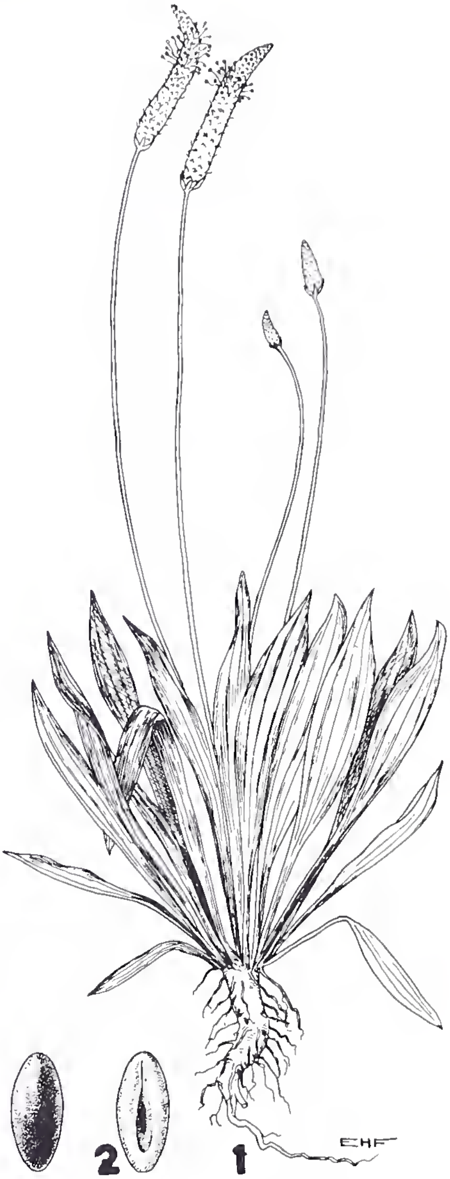

Figure 11—Buckhorn plantain (1) whole plant showing habit; (2) seeds.

Buckhorn plantain *(Figure 11)* is a perennial or biennial which reproduces by seeds. A native of Europe and Asia, it flowers from April to October with seed maturing from May to November. It is found in lawns, meadows, pastures and waste places and quite often in clover and alfalfa fields.

The rootstock is short and thick, with many branch rootlets. The erect, leafless stems rise four to twelve inches, terminating in rat-tail-like flower spikes. The leaves come out in a circular cluster forming a crown; they are two to twelve inches long, narrow lance-shaped, slightly hairy on both sides, with a tuft of brown hairs at the base; the blades are distinctly three to five-ribbed, gradually narrowed along the petiole. The flowers are numerous, possess inconspicuous petals, and are borne in short cylindrical spikes at the end of the stems. The seeds are small, brown, shiny, smooth and boot-shaped, with an indentation in the middle of one side. When wet they are very mucilaginous, aiding in their distribution. An average plant produces about a thousand seeds.

The most effective control measure is to plant seed that is free of this weed. If the weed is present, good cultivation practices must be followed to see that seed formation is prevented. The seeds are long-lived, and, if the soil becomes polluted with them, one cannot expect to eradicate the plant in a short time. Chemicals are a helpful aid for eradication.

PERENNIAL SOWTHISTLE

Sonchus arvensis L.

Perennial sowthistle *(Figure 12)* is a native of Europe and Asia. A perennial that reproduces by seeds and rootstocks, it blooms from June to August and produces mature seeds from July to September. It is found in cultivated fields, pastures and wastelands.

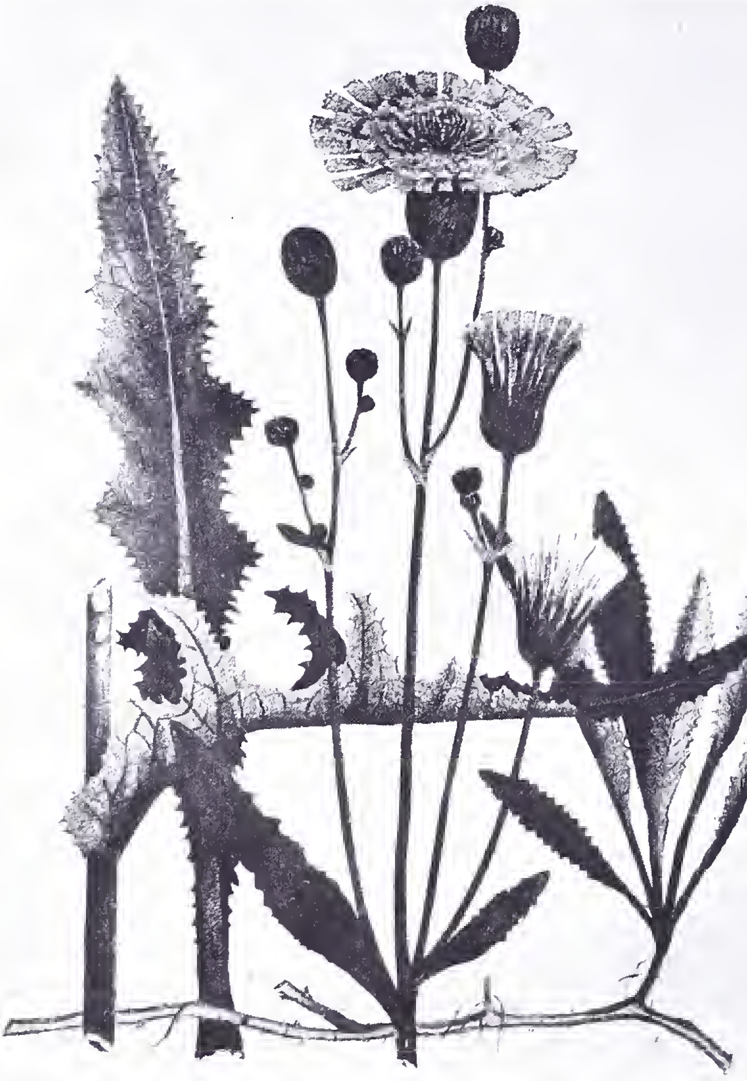

Figure 12—Perennial sowthistle, parts of typical plant showing rootstocks, leaves and flower-head.

The smooth erect stems, which are covered with a whitish bloom and with a milky juice, rise from creeping rootstocks and grow to a maximum height of about five feet. These rootstocks penetrate the soil for several feet, spreading horizontally and producing new shoots from the ever-present buds. The leaves are light green, deeply cut, side lobed pointing backwards, with upper leaves smaller, clasping, margins slightly toothed and prickly. All parts are filled with milky juice. The sowthistles resemble the wild lettuce plants in leaf and in their milky juices.

The flower heads resemble the dandelion, bright yellow, one to two inches wide. Seeds are dark reddish-brown, about one-eighth inch long, slightly flattened with five to seven ribs, and with smaller cross wrinkles. At one end is a hairy tuft that is easily broken off.

The control for perennial sowthistle would be the same as followed for Canada thistle.

BRISTLEGRASS OR FOXTAIL

Setaria spp.

The two bristlegrasses that are bothersome in Pennsylvania are green bristlegrass (*S. virdis* [L] Beauv.) and yellow bristlegrass (*S. glauca* [L] Beauv.). *(Figure 13)* Both have been introduced from Europe and are annuals that reproduce only by seeds. They can be found in cultivated fields, gardens, roadsides and waste places.

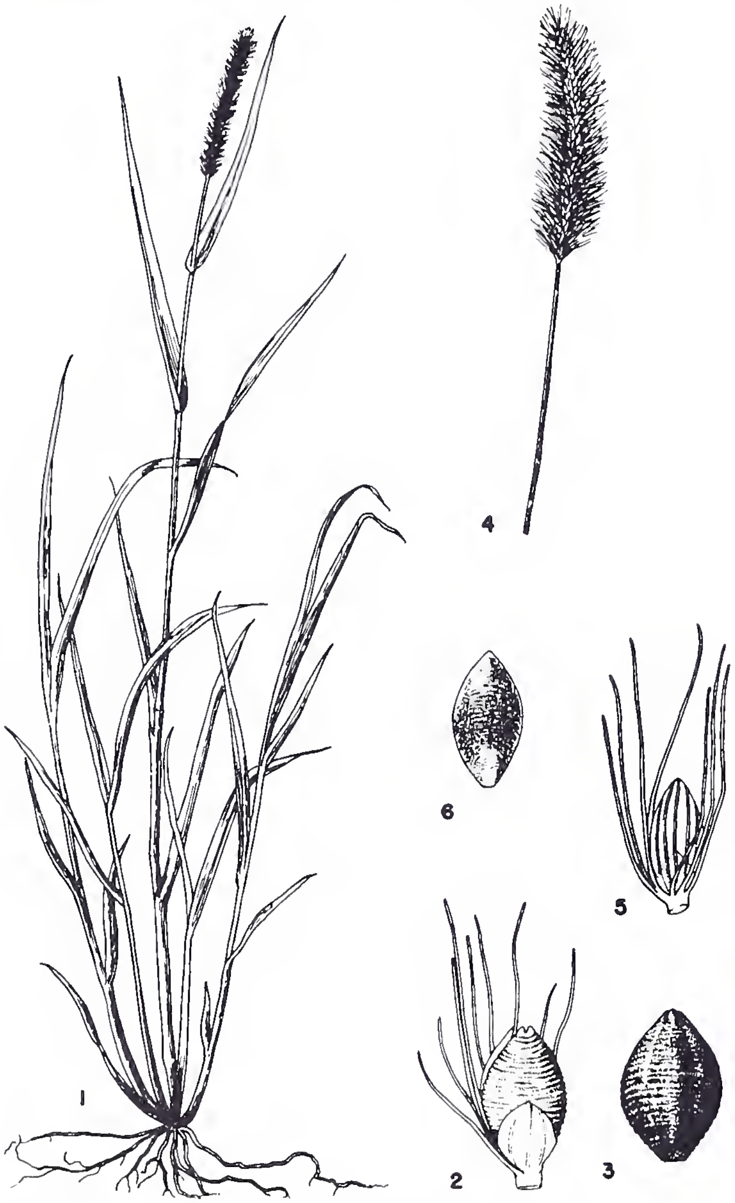

Figure 13—Yellow foxtail (1) whole plant showing habit; (2) mature spikelet; (3) seed. Green foxtail (4) flower cluster; (5) spikelet; (6) seed.

The plant is erect or ascending, stem branching and compressed at the base from a fibrous root system. The leaves are alternate, simple and glaucous. The flower cluster of the yellow bristlegrass is yellowish and shaped like a narrow bottle brush. In green bristlegrass the flower cluster is greenish or purplish, generally tapering toward the top but somewhat broader than in the yellow bristlegrass.

The bristlegrasses can be controlled by the prevention of seed formation and also by cultivation, clipping and crop rotation.

Because of its grazing value and because of its shallow root system, bristlegrass should not be considered as a serious weed where it may be utilized, but its growth should not be encouraged.

BURDOCK

Arctium minus (Hill) Bernh.

Burdock *(Figure 14)* is a biennial that has been introduced from Europe. It propagates by seeds and can be found in waste ground in woods, barnyards, along roadsides and fence rows, about buildings, and usually in at least partial shade.

The first year a rosette of leaves close to the ground is produced from a rather deep tap-root; the second year a three to five foot flowering stalk is produced. The stem is erect, stout, grooved, rough, hairy and much branched. The leaves are dark green, smooth above, light green and woolly-hairy beneath, broadly ovate, blunt, more or less heart shaped with somewhat wavy margins. The flowers are purple or white in numerous heads, on short stalks or sessile in the upper leaf axils or at the ends of branches. The outside is covered with hooked spines. The seeds are oblong, about three-sixteenth inch long, flattened and curved.

Burdock can be controlled by mowing to prevent seed production and also by clean cultivation. It can also be controlled by chemicals.

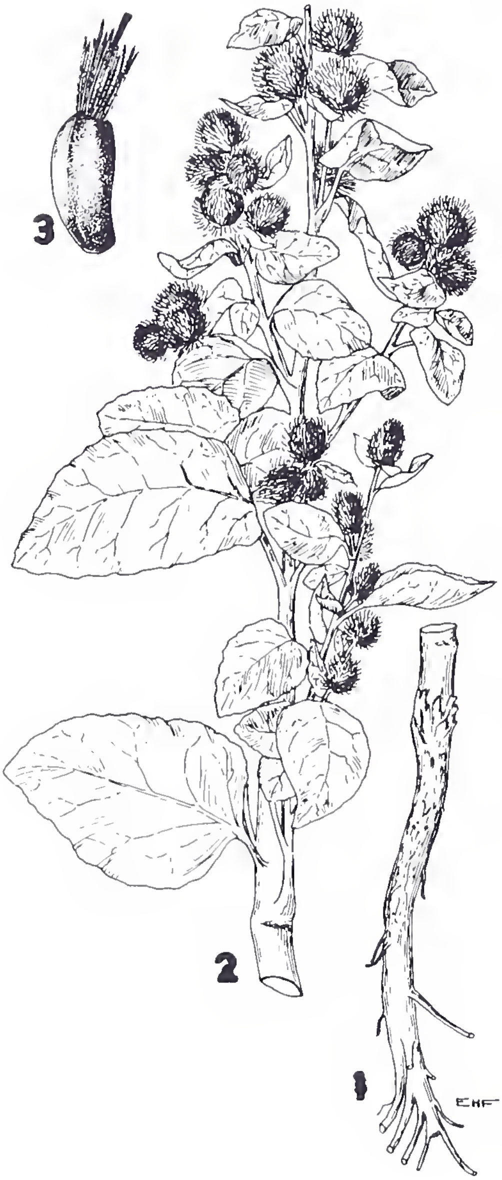

Figure 14—Burdock (1) lower part of stem and portion of root system; (2) upper stem with bur-like flower-head; (3) seed.

WILD CARROT

Daucus carota L.

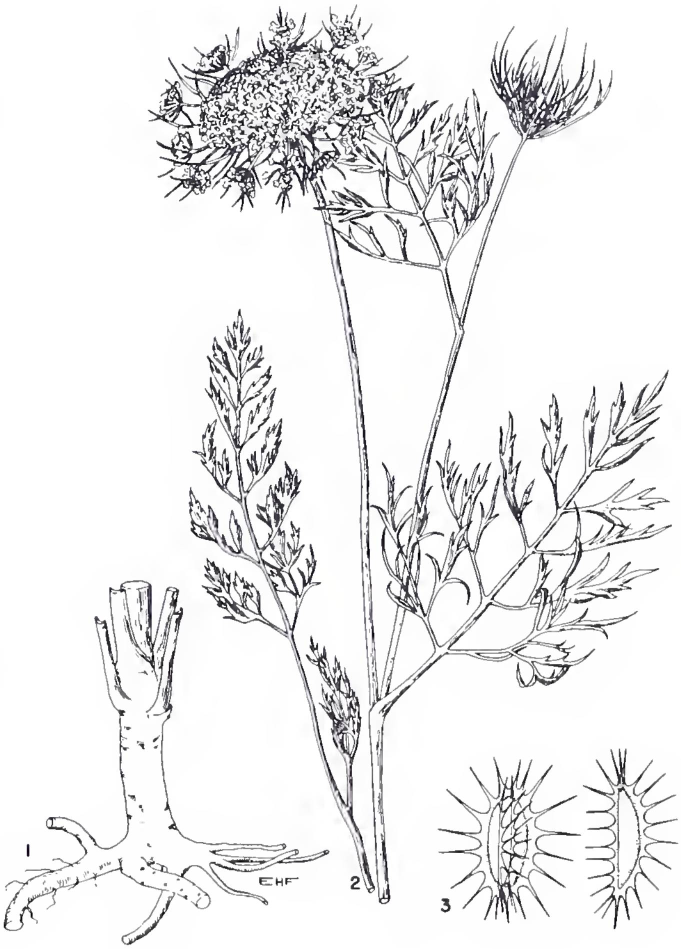

Figure 15—Wild carrot (1) lower part of stem and part of fleshy tap-root; (2) upper part of the plant with flower cluster; (3) seeds.

Wild carrot *(Figure 15)* is a biennial that reproduces by seeds. The first year the plant produces a basal rosette of finely pinnated, divided, hairy leaves. The second year a flowering stem is sent up also containing leaves similar to the basal leaves. The flowers are small and white, borne in umbels at the end of the branches. The seed is ⅛ inch or less in length, one side flattened, the other rounded and showing heavy long-bristled ridges with smaller ones between.

If beauty and delicacy decided the popularity of a plant, this plant would be classed among the most popular garden flowers, but like many plants it is too common and too annoying to the farmers to be called anything but a weed.

The control of wild carrot is not as hard as plants with perennial root systems. The main problem is to keep all plants from producing seed. A field kept in cultivation for several years is a good means of control. The wild carrot can also be controlled by chemicals.

COCKLEBUR

Xanthium Spp.

The majority of the cockleburs *(Figure 16)* in this state are native. Annuals that reproduce from seed, they can be found in cultivated fields, abandoned land, rundown pastures, road ditches and waste areas, and in almost any kind of soil, especially where it is moist.

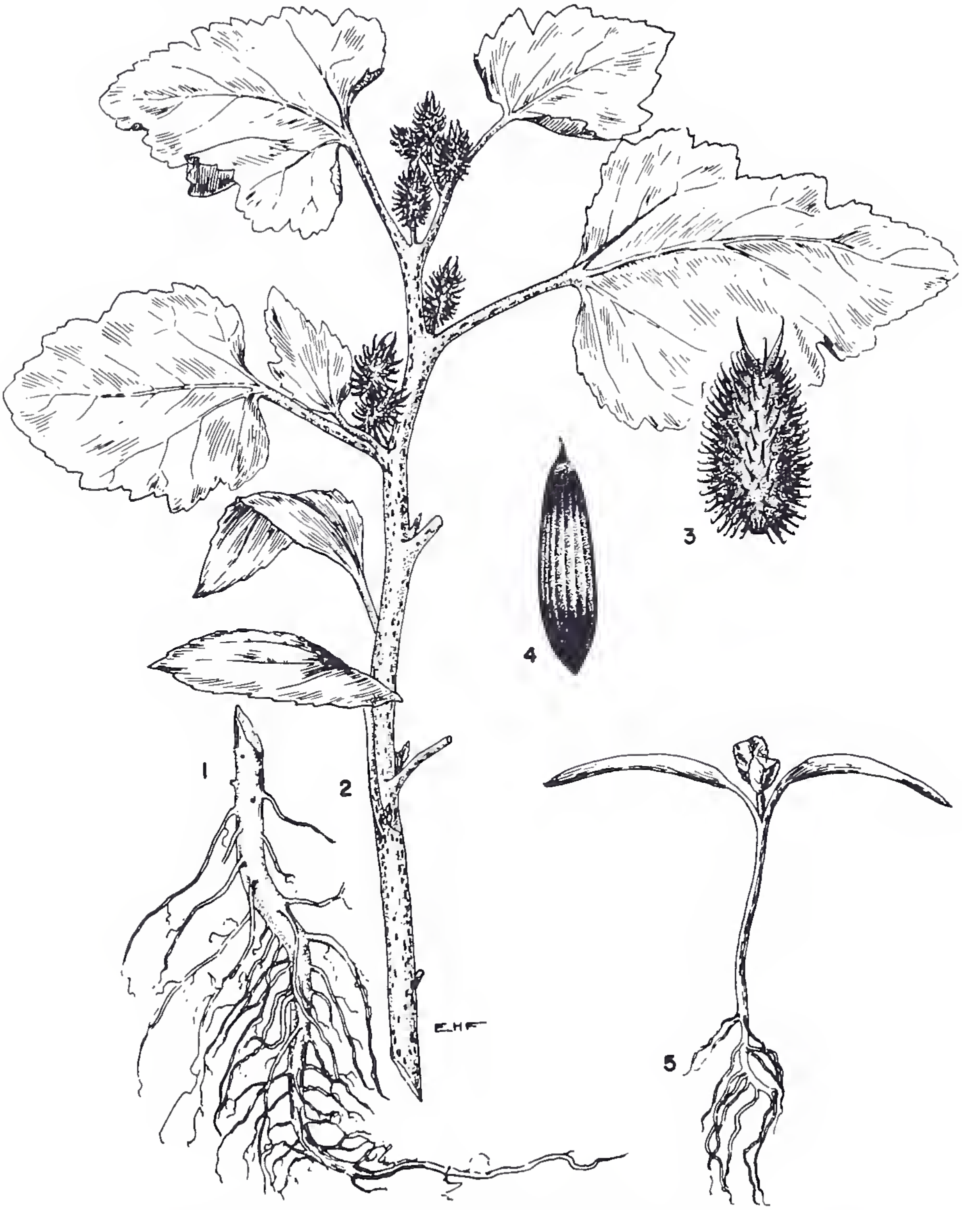

Figure 16—Cocklebur (1) lower part of stem with root system; (2) upper portion of plant with burs; (3) mature bur; (4) seed; (5) seedling.

The fibrous root system gives rise to bushy plants of varying height. The stems are usually ridged, rough, hairy and covered with small dark spots. The leaves are alternate, simple, somewhat toothed or lobed, long-petioled and rough. The leaves are dark or yellowish-green above and pale green below. The flowers are small, in composite heads, clustered in the upper leaf axils. The two black, slightly ridged, oblong and slightly flattened seeds are found inside an oblong bar covered with hooked spines. One seed usually germinates the first year and the other the second year.

Cocklebur can be controlled by the prevention of seed production. They can also be controlled by means of chemicals.

OX-EYE DAISY

Chrysanthemum leucanthemum L.

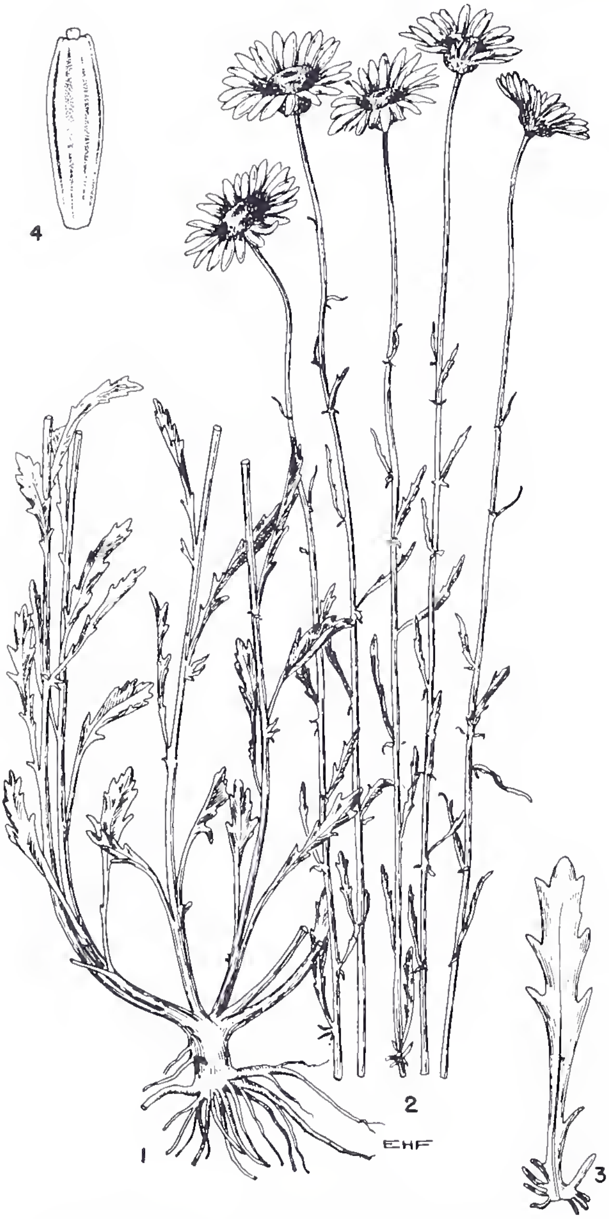

Figure 17—Ox-eye daisy (1) lower portion of plant; (2) upper portion of stem with flower-heads; (3) leaf; (4) seed.

Ox-eye daisy *(Figure 17)* is a perennial introduced from Europe. While the roots are perennial the plant does not spread from the roots like Canada thistle and quackgrass but is propagated entirely from seeds.

Nearly everybody knows the ox-eye daisy, but those who do not may recognize it by its beautiful flowers with yellow centers surrounded by white rays which number from 20 to 30. The stem of the plant is from one to three feet tall often growing in tufts or bunches. The leaves are toothed, cut or divided.

Growth can be controlled by preventing seed production and by clean cultivation. It is difficult to control with known chemicals.

CURLY DOCK
Rumex crispus L.

Curly dock *(Figure 18)* is a perennial and a native of Asia and Europe. It reproduces by seeds and can be found in pastures, along roadsides, cultivated fields and in waste places.

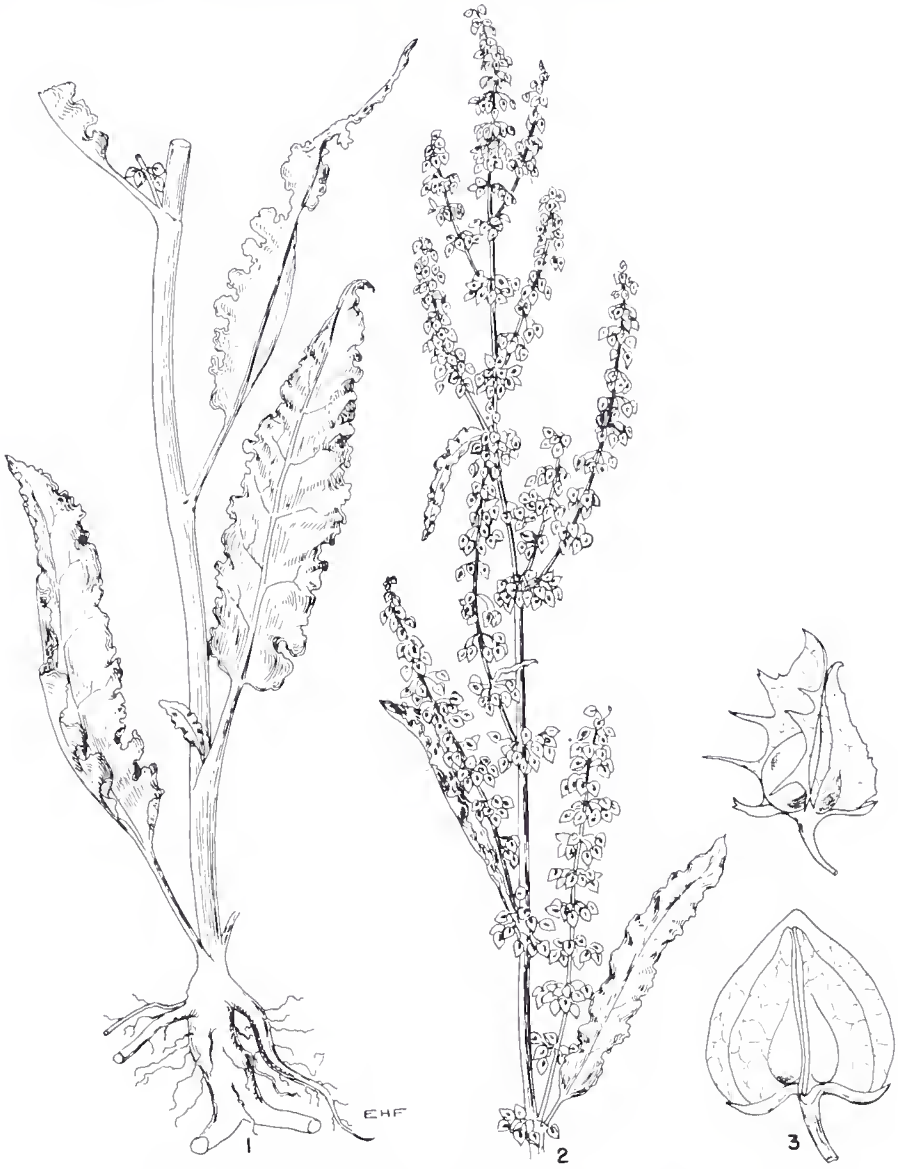

Figure 18—Curly dock (1) lower part of plant; (2) flower cluster; (3) seeds.

The stems are smooth, erect, one to four feet tall, single or in groups, rising from the crown of a large, yellow somewhat branched taproot. During the first year this plant forms a dense rosette of leaves. The leaves are smooth and lance-shaped with wavy edges. Flowers are small in a terminal panicle of whorled ascending racemes. Seeds are brown, shiny, triangular and sharp-edged.

Clean cultivation will control this weed in cultivated fields. In other places the plant should be cut off several inches below the ground surface. They should be destroyed early, by the time they first begin to develop flowers; otherwise the plants may continue to mature seed even after being dug out. The use of chemicals have been effected in the control of dock.

HAWKWEEDS

(*Hieracium* spp.)

There are two species of hawkweeds *(Figure 19)* that are troublesome in this state: orange hawkweed (*Hieracium aurantiacum* L.) and field hawkweed (*H. pratense* Tausch.). These are both introduced perennial plants which are propagated by seeds, roots, and by stolons as runners.

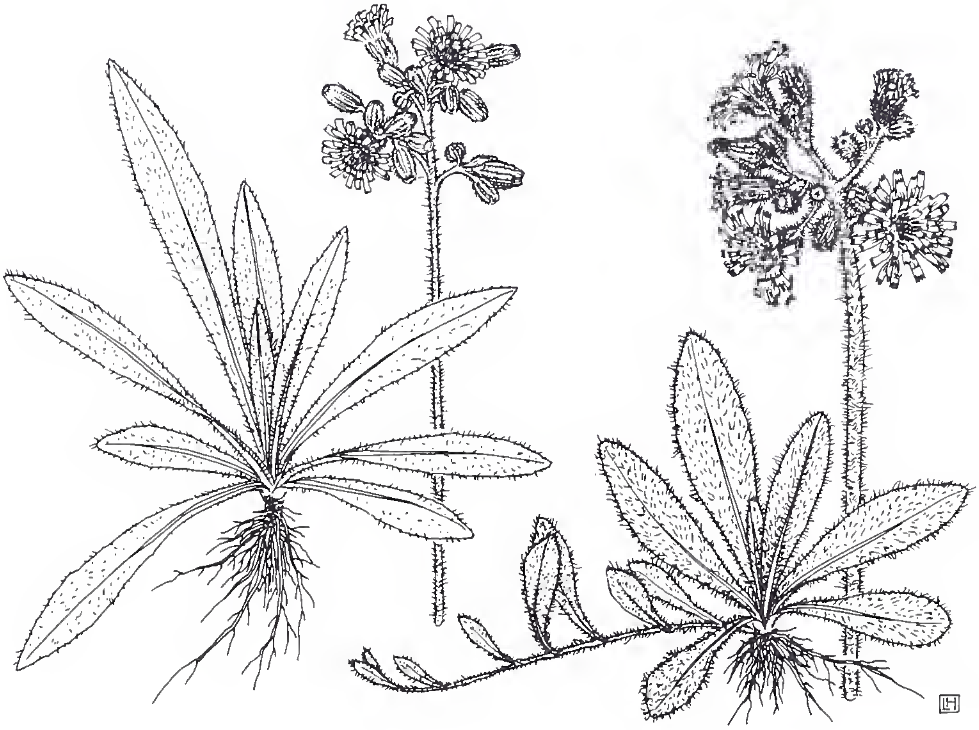

Figure 19—Field hawkweed, basal leaves and flower stalk. Orange hawkweed, basal leaves and flower stalk.

Both plants are similar in appearance. The roots are fibrous and the stems are erect, six to 18 inches or more tall, covered with stiff hairs and containing a milky juice. The leaves are basal, simple, and covered with stiff hairs. The flower heads are clustered at the top of the leafless stems. In *H. aurantiacum* L. the flowers are orange-red in color and yellow for *H. pratense* Tausch. The seeds are about 1/16 inch long, dark brown or black, cylindrical, elongated, and covered with longitudinal ridges.

New plants originate from the slender fibrous roots of the parent plants. Runners originating at the base of the plant run out on top of the ground in all directions. These runners take root and produce new plants. Very few weeds of any kind are reproduced by both roots and stolons. If stolons are present new plants will not spring from the roots, or, if the roots originate new plants, the stolons are not present. In addition to these methods of propagation, the plant is also reproduced from seed.

These habits of reproduction make hawkweeds a difficult weed to control. They can easily be controlled in fields which allow clean cultivation. In places which cannot be cultivated they should be kept cut close to the ground with a hoe. The hawkweeds are easily controlled with chemicals.

LAMB'S-QUARTER

Chenopodium album L.

Lamb's-quarter *(Figure 20)* is an annual that reproduces by seeds. It is a native of Asia and Europe and can be found in cultivated fields, gardens and waste places.

Stems are three to four feet tall, sometimes much taller, and spring from a short, much-branched tap root. Red or light green striations often mark the smooth stems, usually with very little branching. Leaves are alternate, simple, ovate in shape, with edges irregularly toothed, mealy beneath. Flowers are small and green, found at the ends of the branches and in the axils of the leaves. Seeds are lens-shaped, with a marginal notch, black and somewhat glossy, about 1/16 inch in diameter, often with fruit parts attached.

Lamb's-quarter can easily be controlled by hoeing, pulling, mowing or cultivation, provided no single plant is permitted to mature its seed. Chemical control has proved moderately effective.

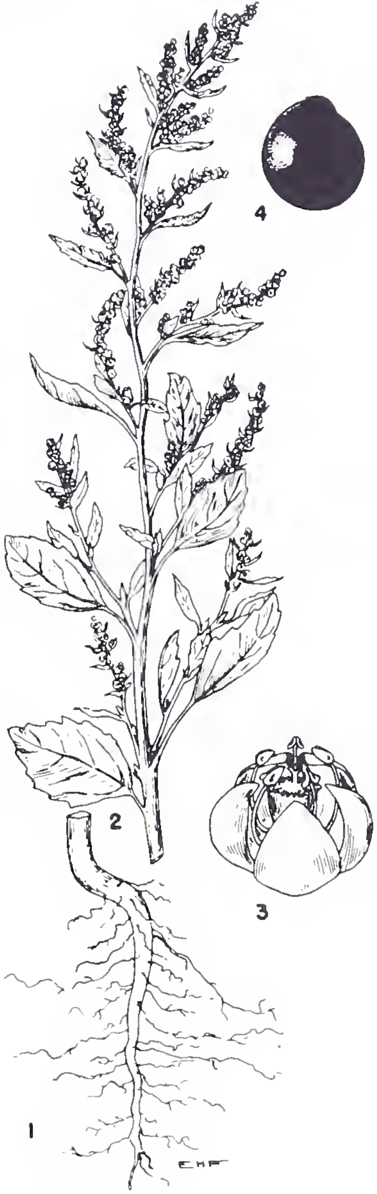

Figure 20—Lamb's-quarters (1) lower part of stem and roots; (2) upper part of stem with flower clusters; (3) flower; (4) seed.

NUT-GRASS

Cyperus spp.

The nut-grasses *(Figure 21)* are both native and introduced plants. They are perennials that reproduce by seeds and tuber-bearing rootstocks. These plants can be found in moist fields, banks of streams and ditches.

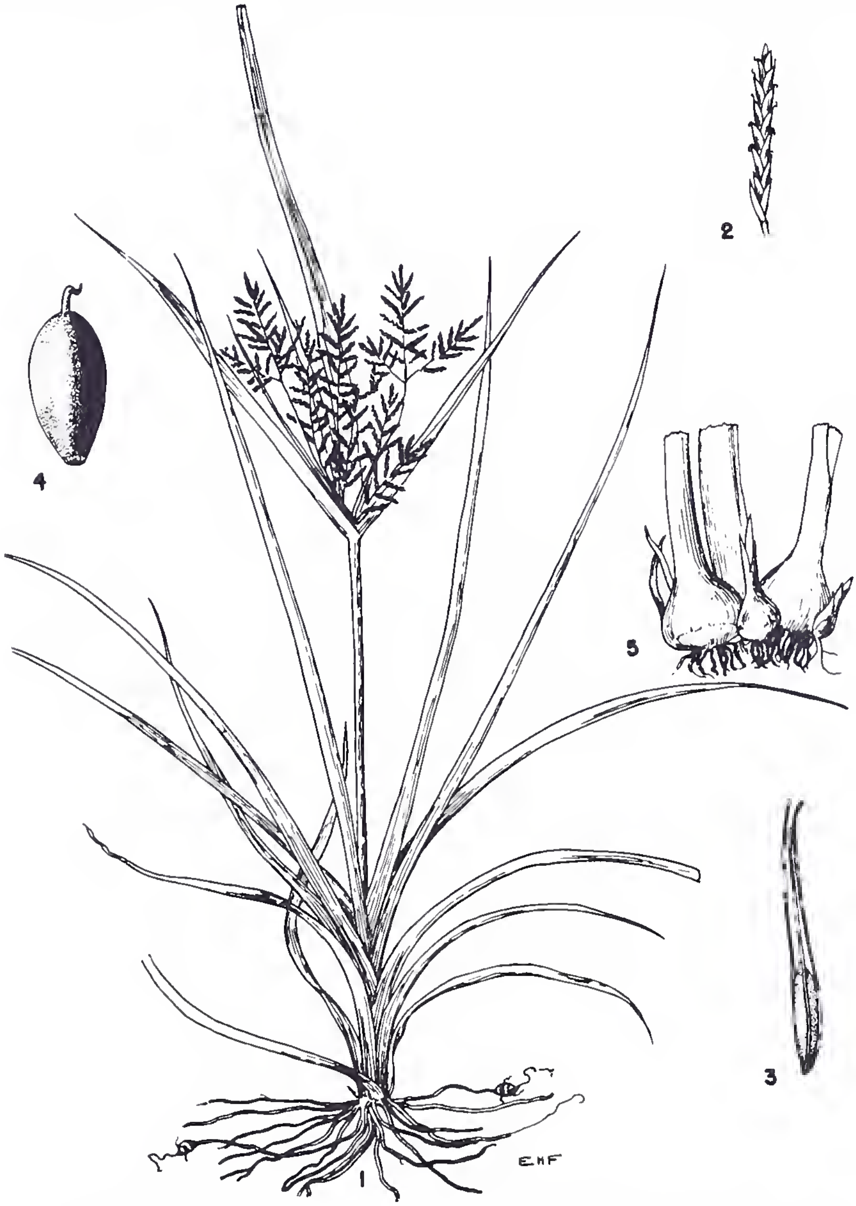

Figure 21—Nut-grass (1) whole plant, showing general habit; (2) young spikelet; (3) and (4) seed; (5) hardened, enlarged bases of stem.

The nut-grasses are grass-like plants with short, scaly rootstocks often bearing small, nut-like tubers at the tips. The stems are triangular in cross-section and filled with whitish pith, not round and hollow as in most grass stems. The leaves are in three vertical rows, each leaf consisting of a blade and a closed part, the sheath, which surrounds the stem. The flowers are small and arranged in narrow, light brown or chestnut-colored clusters. The seed is three-angled, 1/16 inch long and yellowish-brown in color.

Nut-grass can be controlled by frequent cultivation for one season. If poor drainage persists it will return again. Nut-grass can also be controlled by some chemicals.

PIGWEEDS

Amaranthus spp.

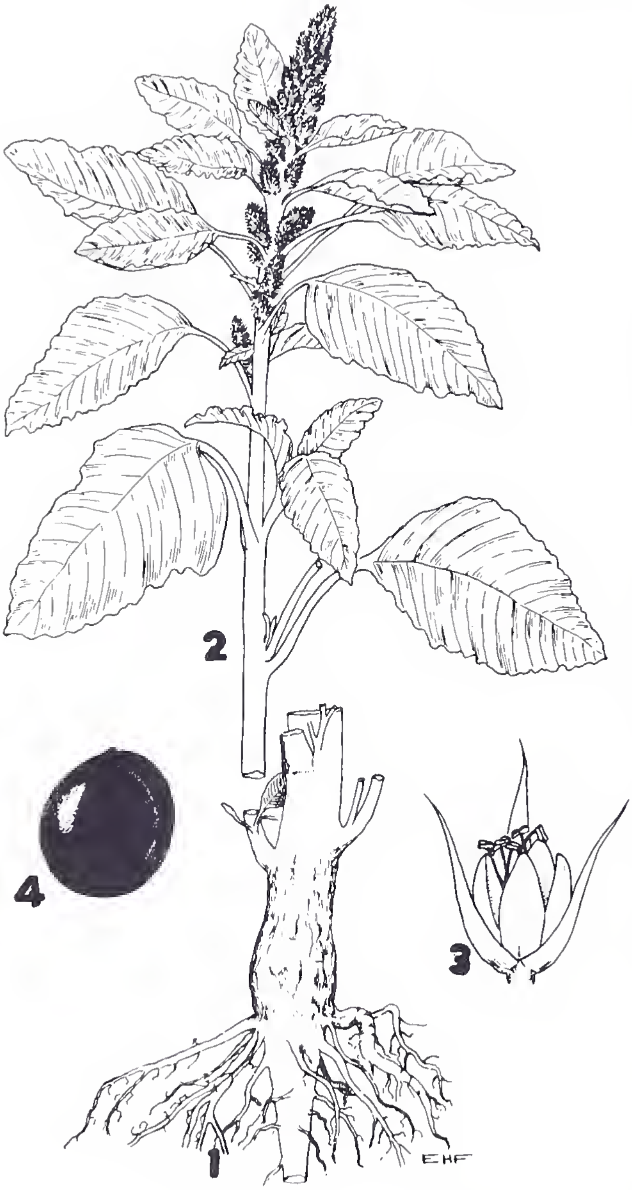

Figure 22—Pigweed (1) lower stem and roots; (2) upper stem with leaves and flower clusters; (3) flower; (4) seed.

The pigweeds *(Figure 22)* are all annuals reproducing by seeds. They are natives of America flowering from June to October.

There are many species of pigweeds in this state, but probably the most common is one known as redroot amaranth (*Amaranthus retroflexus* L.). The very rough erect stem, up to six feet or more tall, arises from a shallow red taproot which is fringed with pink and white rootlets. The plant branches freely if not growing under crowded conditions. The leaves have long petioles and are rather dark green in color. The flowers are small and green, grouped in spikes in the upper leaf axils and in a rather thick heavy terminal panicle. The seeds are lens-shaped, shiny, black, more or less oval and notched at the narrow ends. The seeds are extremely viable, capable of living for a long time (30 or more years) in the soil.

Control is not too difficult by hoeing, pulling, mowing or clean cultivation, provided no single plant is permitted to mature its seed. A single plant may produce over 100,000 seeds. Herbicides can be used fairly effectively before the weed blooms.

COMMON RAGWEED

Ambrosia artemisiifolia L.

Common ragweed *(Figure 23)* is a native annual of America which reproduces by seeds. It flowers from July to September and seeds mature from August to November. It can be found in cultivated fields, run-down pastures, abandoned areas, roadsides and other waste places.

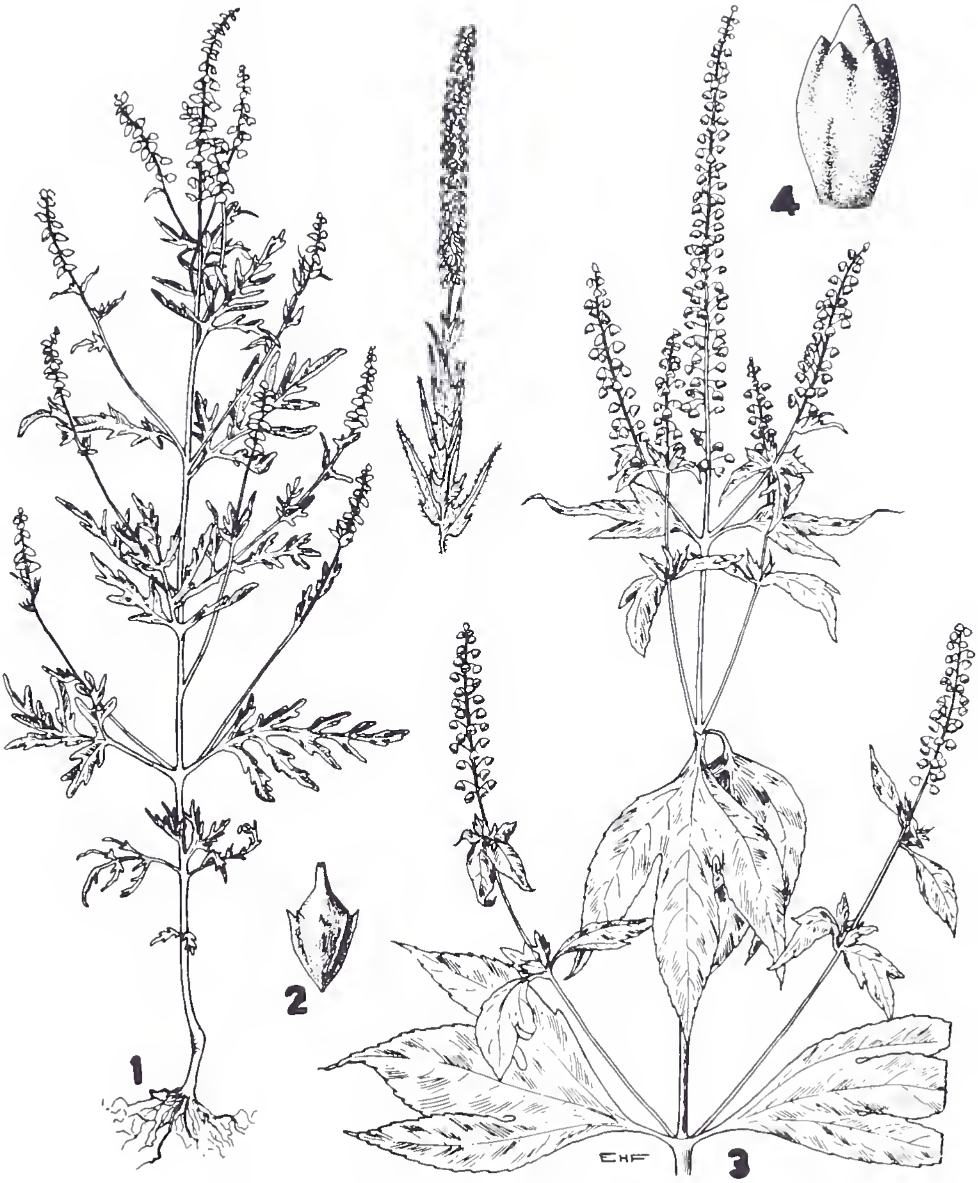

Figure 23—Common ragweed (1) whole plant showing habit; (2) seed. Giant ragweed (3) portion of stem with flower clusters; (4) seed.

The plant is usually two and a half feet high or more, bushy-branched above and hairy from a fibrous root system. The leaves are nearly smooth, deeply cut into several, toothed portions, mostly alternate, and deep green in color on the upper surface but paler beneath. The flower heads are of two kinds: pollen-producing heads, small, borne in slender clusters at the tips of the branches; and seed-producing heads, few and inconspicuous when young, borne with small leaves at the bases of leaves and in the forks of upper branches. Seeds about ⅛ inch long are enclosed in a pointed, somewhat top-shaped, woody hull, light brown in color and bearing several longitudinal ridges ending in short spiny projections.

Hay-fever sufferers, instead of calling ragweed "food for the gods," as its name Ambrosia indicates, perhaps would prefer to call it something else. Good clean cultivation will help control this weed, or mowing infested areas before bloom stage will keep it from seeding. Chemicals can also be used for control.

Common ragweed is the most common of the ragweeds found in this state, but the giant ragweed (*Ambrosia trifida* L.) is also found in large quantities. It averages six to 12 feet in height. It differs from common ragweeds in its large three to five-lobed leaves, all in pairs at the joints of the stem. The seeds are similar but larger.

WINTERCRESS

Barbarea vulgaris R. Br.

Wintercress *(Figure 24)* is an introduced plant from Europe. It is a biennial or perennial and reproduces mainly by seeds. The plant begins to bloom in April and continues to bloom and form seeds for about three months. It can be found in grain fields, grass fields, gardens and waste places.

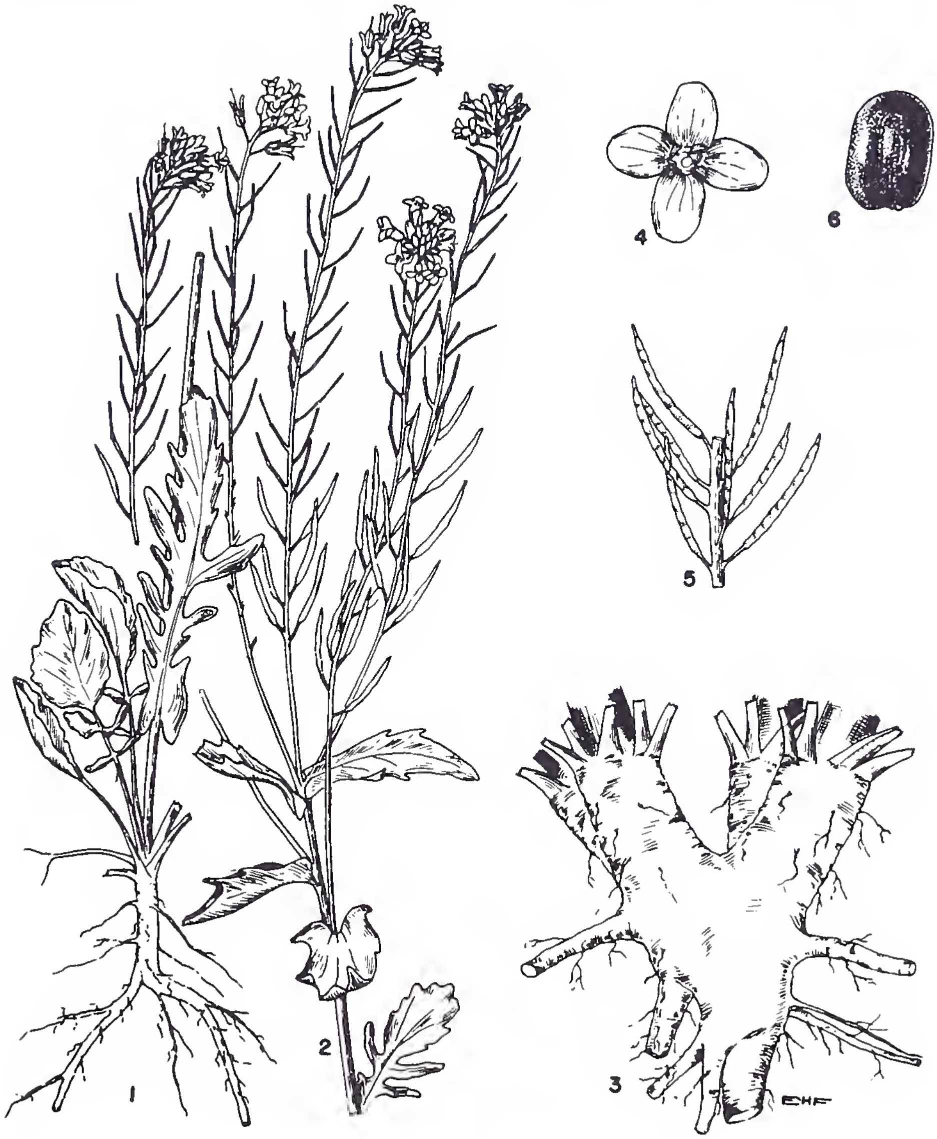

Figure 24—Wintercress (1) lower part of stem and root of young plant; (2) upper part of stem with flowers and seed-pods; (3) large fleshy tap-root of older plant; (4) flower; (5) mature seed pods; (6) seed.

Wintercress has a deep, thick tap-root and is branched. The stem is smooth and erect, developing in the spring from a cluster of leaves at the surface of the ground. The leaves on the stem are alternate and lobed at the base. The rosette of leaves at the base is dark green, thick, smooth, shining with heart-shaped terminal lobes and one to four lateral pairs along the midribs. These glossy green rosettes are very conspicuous when first appearing in early spring and at that season they make excellent greens. In Europe they are cultivated for use as potherbs. The yellow flower clusters are finger-like in outline, borne at the top of the plant. The seed-pods are narrow and pointing straight upward. Seeds are about 1/16 inch long, broadly oval or oblong, notched at one end, roughened and dull grey-brown in color.

Since the plant is propagated mainly by seed, good clean cultivation will help control it in some crops. In pastures and waste places it should be mowed before seeds can be produced. In other places pulling, hoeing or any such methods will help prevent seed production. Known chemicals are of little use because of the glossy basal leaves.

ANNUAL BLUEGRASS

Poa annua L.

Annual bluegrass *(Figure 25)* is an annual grass that was introduced from Europe. It flowers and produces seeds from April to October. It can be found in waste places and lawns throughout the warmer parts of the U.S.

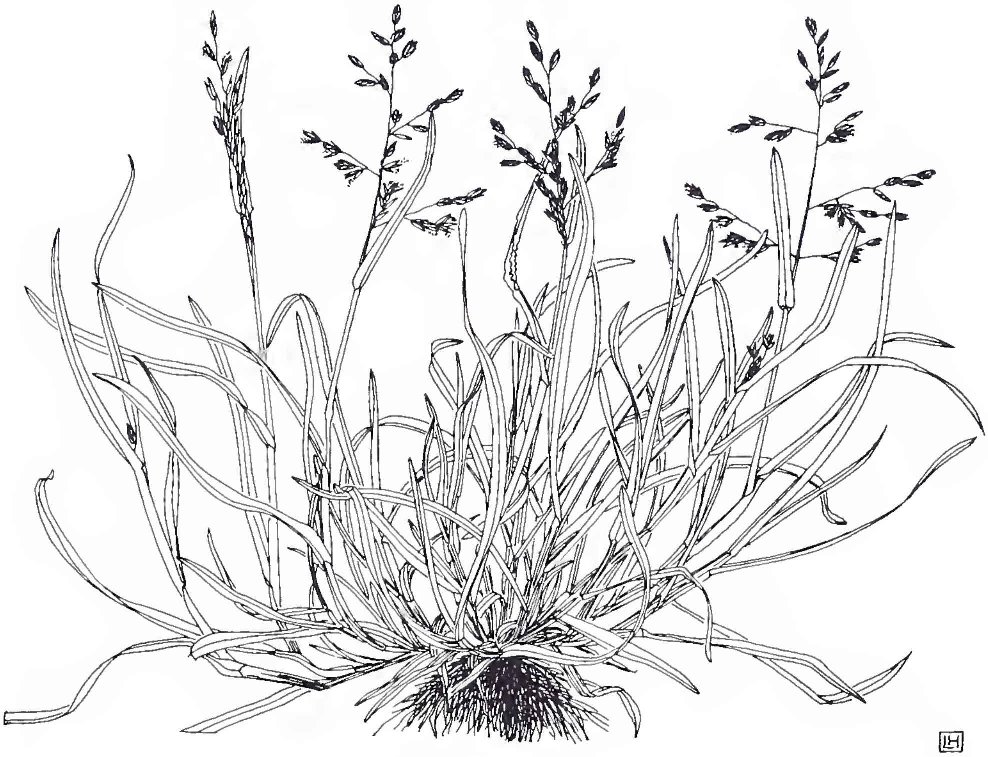

Figure 25—Annual bluegrass whole plant showing seed heads.

It is a tufted, bright green, erect to spreading grass. Sometimes it roots at the lower nodes. The blades are soft in texture. The seed producing panicles are pyramidal in shape and from two to three inches high. Seeds are approximately elliptic in shape about ⅛ inch long. Tan in color with many hairs at the base.

It can be controlled by pulling in early spring. Requires close mowing to prevent seed formation. Known chemicals are of little use.

COMMON CHICKWEED

Stellaria media (L.) Cyrillo

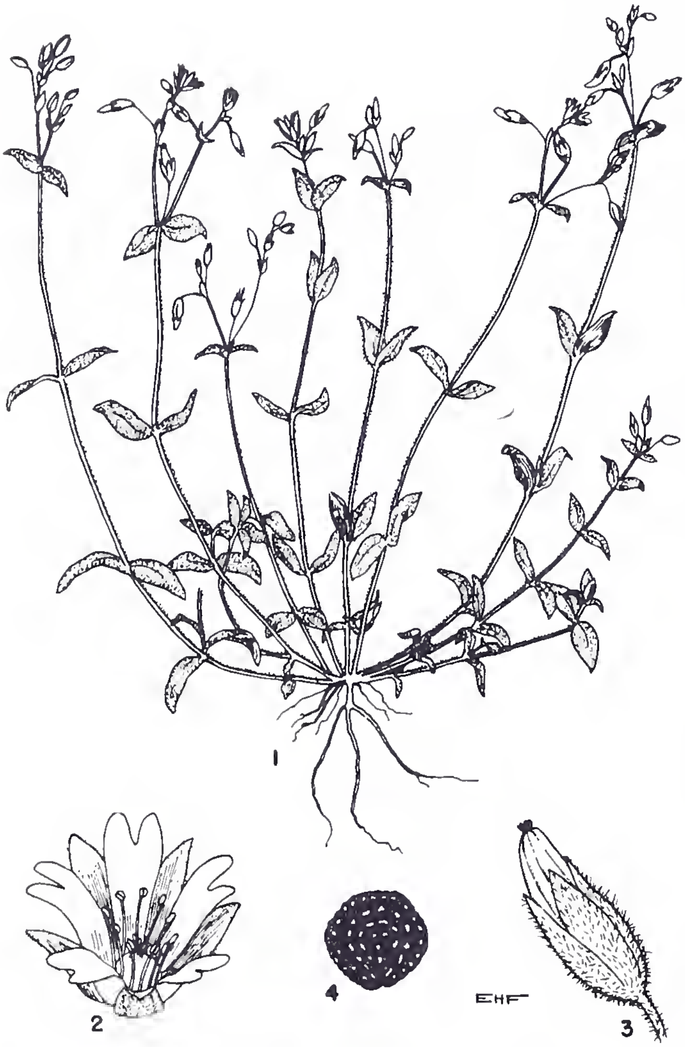

Figure 26—Common chickweed (1) plant showing habit; (2) flower; (3) seed-pod; (4) seed.

Common chickweed *(Figure 26)* is an annual or winter annual which reproduces by seeds and creeping stems which root at the joints. The plant can be found in gardens, lawns, meadows, cultivated fields and waste places throughout the world.

The roots are short, and stems are much-branched, spreading on the surface of the ground or erect at the tips, with a line of hairs down on one side. The leaves are mostly egg-shaped, pointed at the tips, stalked, smooth, attached in pairs to the stem. The flowers are small and white, star-shaped. So numerous are the leaves that the plant often covers the ground like a net. Seeds are small and somewhat heart shaped, sides slightly convex, roughened by curved rows of small tubercles, dull reddish brown in color.

Chickweed can be a serious pest in lawns. It should be grubbed out and fertilizer applied to help the grass crowd it out. Hand weeding is also recommended. Above all, do not let it produce seed. Chemicals are also useful in controlling chickweed.

MOUSE-EAR CHICKWEED

Cerastium vulgatum L.

Mouse-ear chickweed *(Figure 27)* is a perennial which reproduces by seeds and creeping stems. The plant can be found in pastures, lawns and cultivated soil.

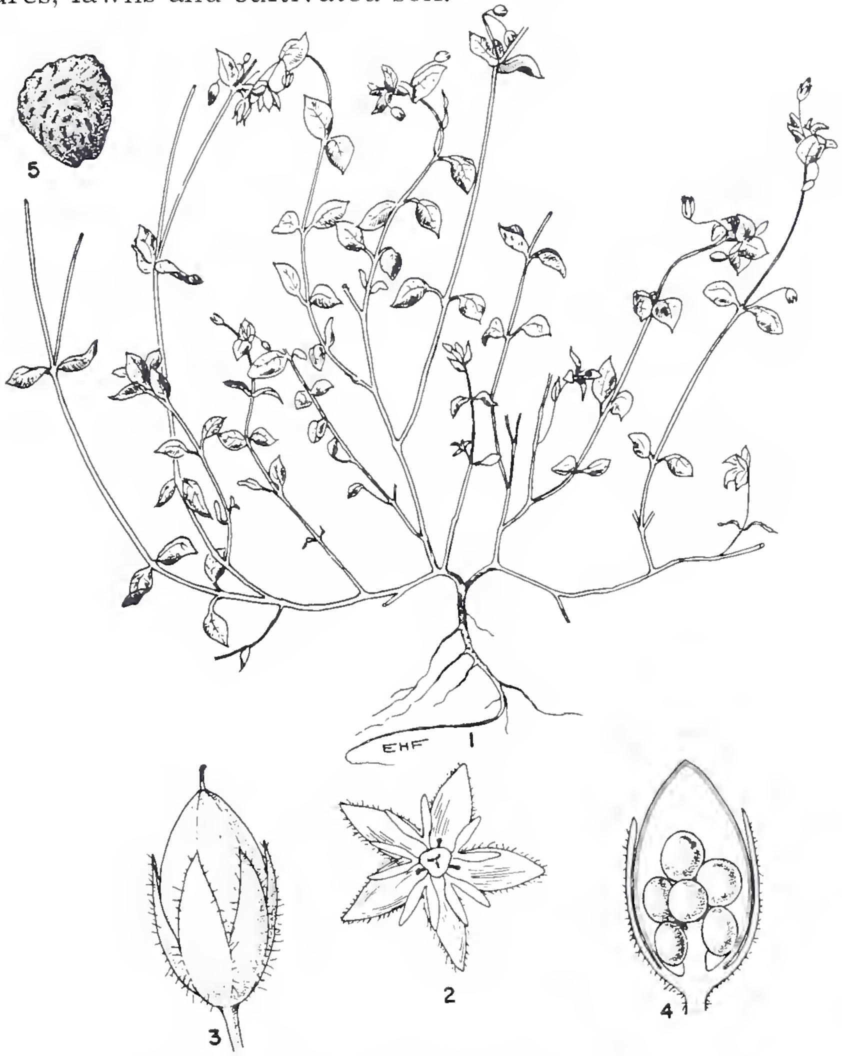

Figure 27—Mouse-ear chickweed (1) plant showing habit; (2) flower; (3) and (4) seed-pod; (5) seed.

The roots are short, and stems are hairy, growing in small clumps, erect or partly spreading over the ground and sometimes rooting at the lower joints. The leaves are small, very hairy, mostly narrowly oblong, attached in pairs to the stems without stalks. The flowers are small and white, star-shaped. The seeds are chestnut brown in color, small, flat on the sides and the back curved and roughened by irregular rows of tubercles.

This weed can be controlled in the same manner as common chickweed.

CHICORY

Cichorium intybus L.

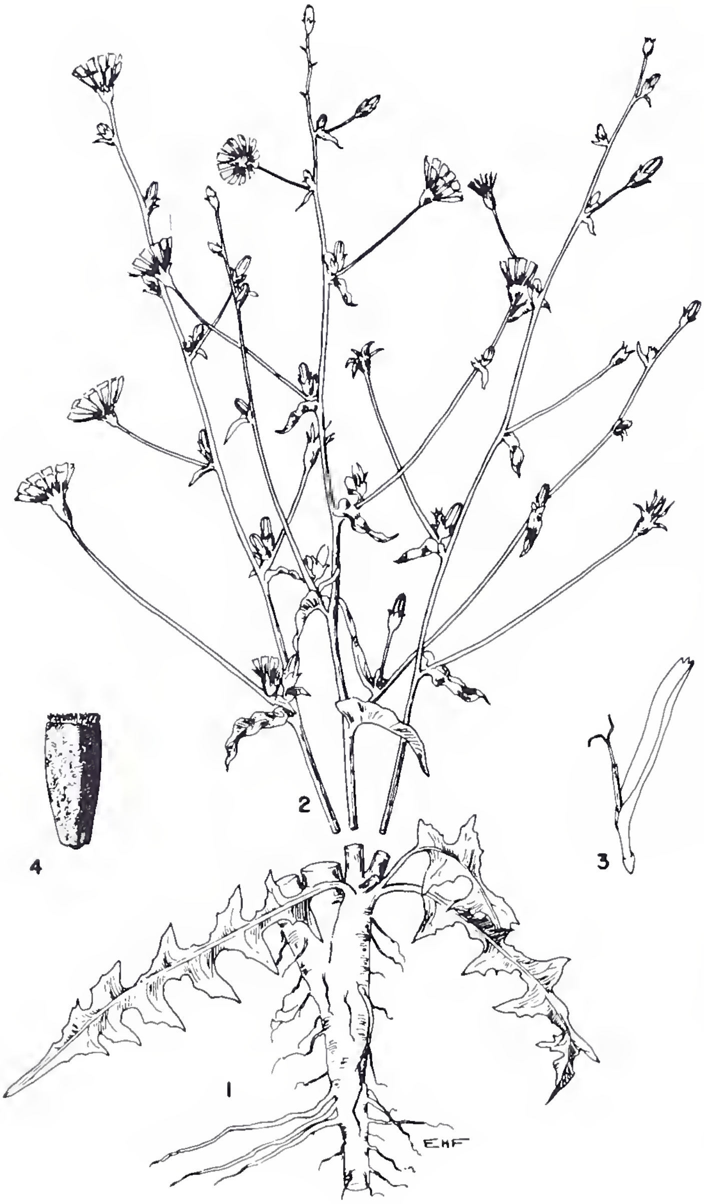

Figure 28—Chicory (1) lower part of plant; (2) upper portion of stems with flower-heads; (3) individual petal-like flowers; (4) seed.

Chicory *(Figure 28)* is a perennial with milky juice. It has a large, deep, fleshy tap-root. The stem is erect, one to six feet tall, branching, hairy and hollow. The large lowermost leaves are clustered at the base resembling those of dandelion. The upper leaves are alternate, smaller, stalkless, smooth, nearly oblong, the edges merely bearing short teeth, or more deeply cut at the base. The flower heads are bright blue, the central portion as well as the rim composed of similar petal-like flowers, all of which fold together at mid-day. The seed is narrowly wedge-shaped, four to five-angled, light brown and bears at the top a row of short bristly scales.

It can be controlled in cultivated land with cultivation and is easily controlled with chemicals.

CRABGRASS

Digitaria spp.

Crabgrass *(Figure 29)* is an annual reproducing by stems rooting at the nodes and seeds. It is found in gardens, fields, lawns and waste places. Crabgrass starts late and is usually killed by the first frost. The plant is tufted, the stems mostly prostrate, freely branching. The top of the flowering branches are four to seven-

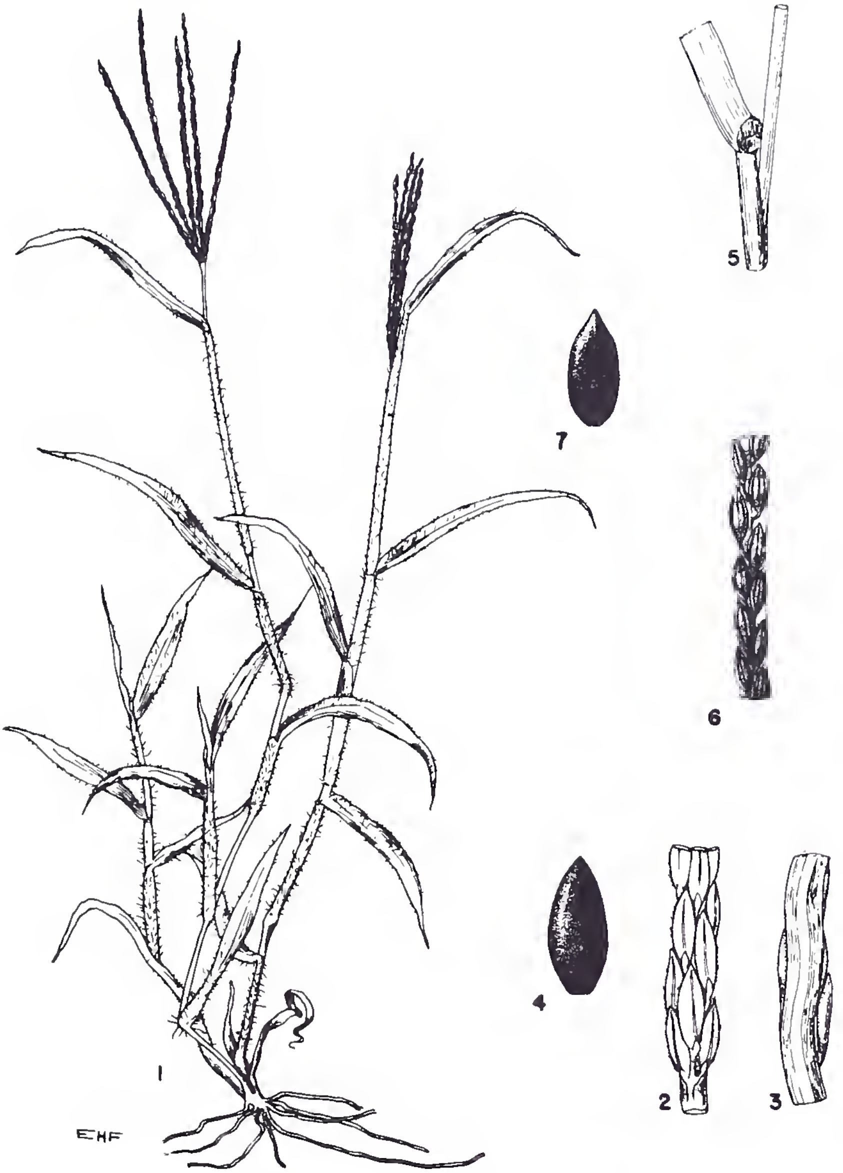

Figure 29—Large Crabgrass (1) whole plant; (2) and (3) section of flower stalk; (4) seed. Small Crabgrass (5) portion of stem and leaf; (6) section of flower stalk; (7) seed.

fingered, radiating outward from the main stem. The small individual flowers are in two rows on one side of the flattened stalk. The seed is long, oval, finely-granular and light yellow.

There are two species of crabgrass usually found in lawns: the large crabgrass (*Digitaria sanguinales* [L.] Scop.) and small crabgrass (*Digitaria ischaemum* [Schreb.] Muhl.). The small crabgrass differs from the large in that the stems are usually shorter, leaf sheaths and blades nearly smooth, and often more purplish in color.

To help control it in lawns the grass should be kept well fertilized, since this will help crowd out the crabgrass. The lawn should be mowed as high as possible, never closer than one and one half inches. When it appears in limited quantities it should be hand weeded. Rough raking before mowing and catching all grass clippings will help reduce seed production. Chemicals aid in its control.

DANDELION

Taraxacum officinale Weber.

Dandelion *(Figure 30)* is a perennial with milky juice. It has a long, thick tap-root. The stems are short, with leaves crowded into a cluster at the base. The leaves vary in shape but are mostly oblong in general outline, and usually deeply and irregularly cut. The yellow flower heads, composed entirely of petal-like flowers, are found on hollow stalks. The seeds are yellowish-brown in color, about ⅛ inch long and tapering into a long, threadlike tip bearing a circle of five whitish hairs.

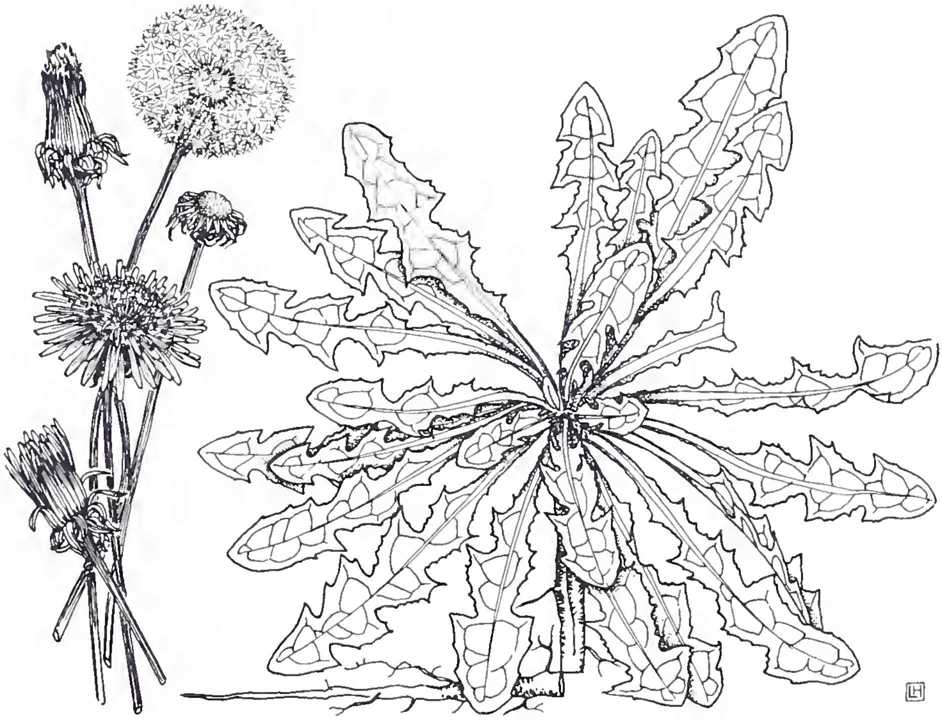

Figure 30—Dandelion, whole plant showing basal leaves and tap-root, flower and seed heads.

Dandelion is a problem in lawns and overgrazed pastures where the sod is open and poorly developed. An application of fertilizer will invigorate grass which will help crowd out the weeds. It is easily controlled with chemicals.

PURSLANE

Portulaca oleracea L.

Purslane or pusley *(Figure 31)* is an annual that was introduced from Europe. It flowers from July to September and produces seed from August to October. It can be found in lawns and gardens and waste places.

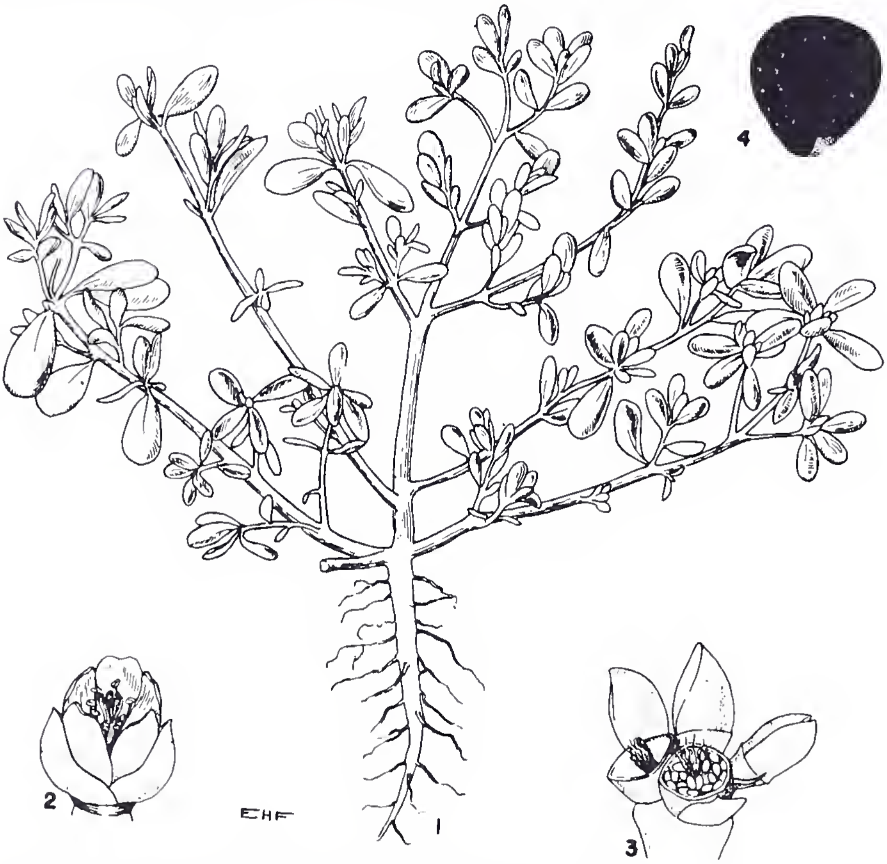

Figure 31—Purslane (1) whole plant; (2) flower; (3) cluster of seed-pods; (4) seed.

The plant lies nearly prostrate and has thick fleshy stems and leaves. Flowers are small and yellow and only open in sunshine. Fruit is a capsule producing numerous small shiny, egg-shaped, black seeds.

Clean cultivation or hoeing will help to control this pest.

GROUND IVY

Glechoma hederacea L.

Ground ivy or gill-over-the-ground *(Figure 32)* is a perennial native of Europe. It flowers from April to July and produces seed from late May to August. It can be found in damp rich or shady soils of lawns or gardens.

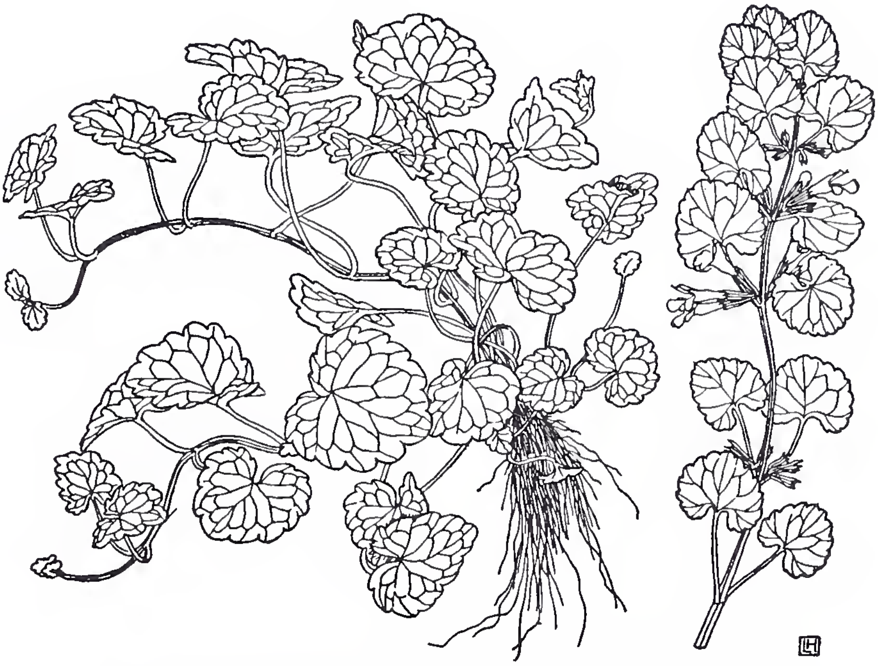

Figure 32—Ground Ivy plant and stem showing flowers.

It is a creeping plant with 4 angled stems, rooting at the nodes. The flower is two-lipped blue to purple in small clusters. Seeds are very small, ovate in shape and dark brown in color with a white spot at the base.

It can be controlled by hand weeding or hoeing.

SHEEP SORREL

Rumex acetosella L.

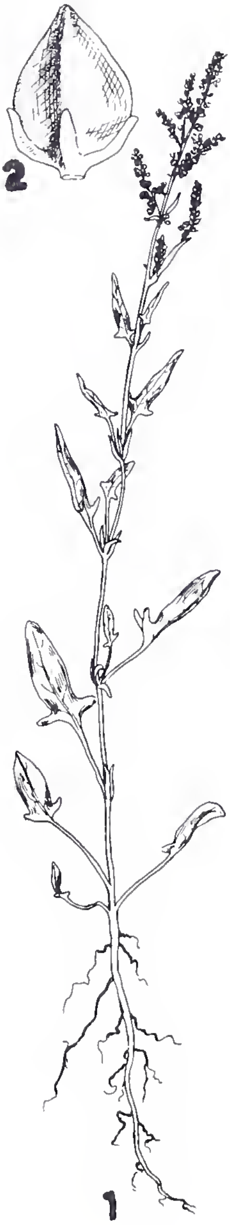

Figure 33—Sheep sorrel (1) whole plant; (2) seeds.

Sheep sorrel *(Figure 33)* is a perennial that reproduces by creeping roots and seeds. It can be found in waste ground, meadows, pastures, lawns and any soil that tends to become poor.

The plant has an extensive creeping rootstock system. The leaves are spear-pointed, borne on long stems. The flowers are numerous, small, in panicles, maturing from a greenish-red to rich maroon in color. The seeds are less than 1/16 inch long, three-angled, reddish-brown, glossy, but usually surrounded by a persistent toughened perianth.

A well-fertilized lawn will help control this weed. Continued digging of plants in lawns will soon starve its root system. Heavily infested areas may be treated with chemicals with fair results.

POISON IVY, POISON SUMAC AND THEIR RELATIVES

Rhus radicans L. and *Rhus vernix* L.

Many people are very susceptible to ivy poisoning, which is caused by a non-volatile oil *(Figure 34)*. These minute particles of oil come in contact with the skin and cause inflammation, followed by little watery blisters which itch and burn and spread

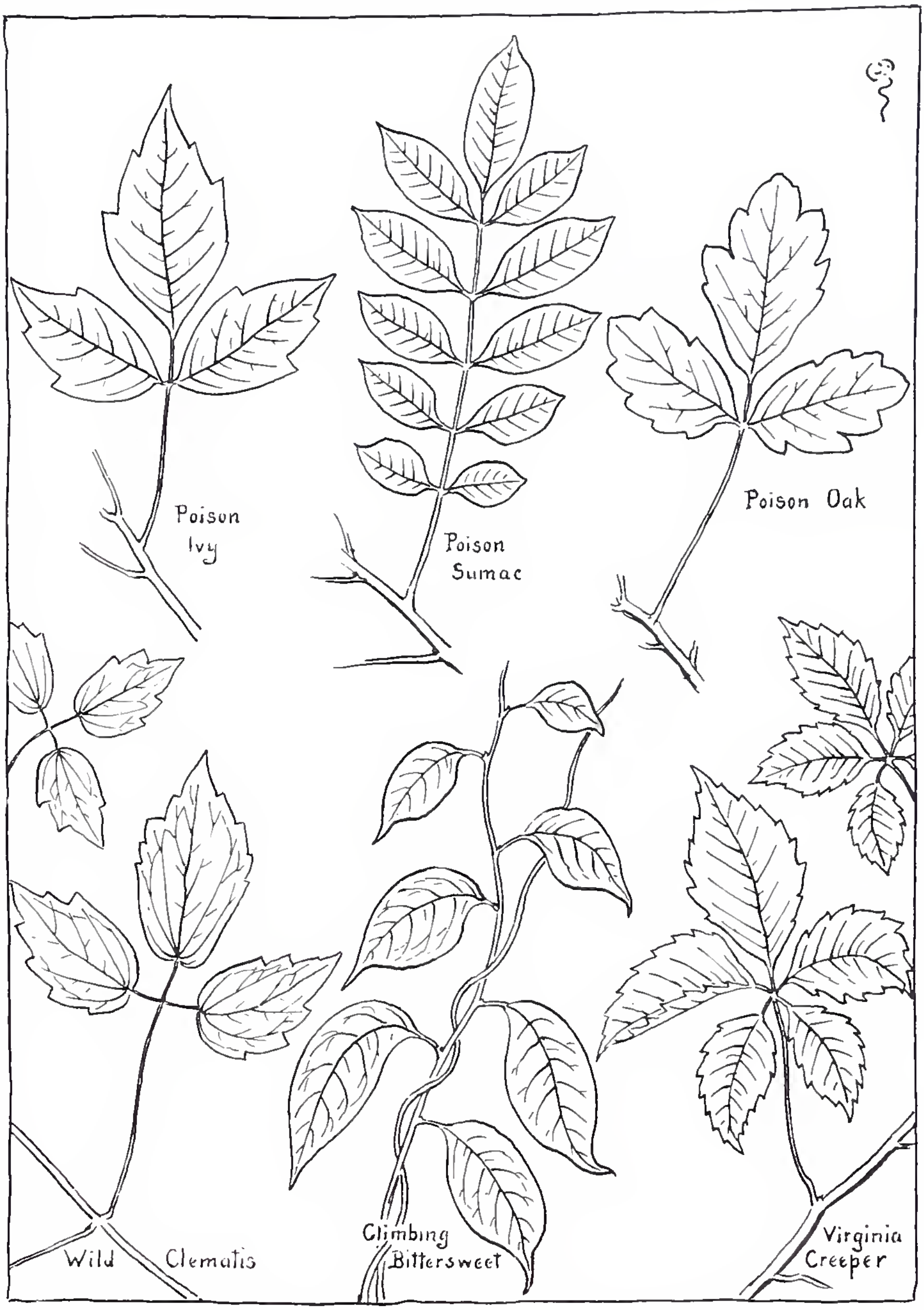

Figure 34—Poison Ivy, Poison sumac. Poisonous plants and plants with similar leaves.

rapidly over the body if not checked. All parts of the plant are poisonous and at all times of the year. Some people are so sensitive to the poison that they believe they get it merely walking past the plant without coming in actual contact with it. But more likely the persons affected have unconsciously come in contact with the plant, or perhaps they have gotten the poison by handling their shoes or some other parts of their clothing that have come in contact with it.

Prevention is easier than the cure, and those who are susceptible should be cautious and, if possible, not come in contact with the plant. If they have come in contact or suspect that they have been exposed to poison ivy, the exposed parts of the body should be washed thoroughly with hot water and soap as soon as possible. Effective medical preparations have been developed to provide relief.

Poison ivy is a vine, climbing by means of aerial roots. Sometimes confused with Virginia creeper, it may easily be distinguished by its three shiny leaflets, instead of five leaflets, and by its white, instead of blue, berries.

There is a low erect shrub form of poison ivy which sometimes covers large areas. These upright branches spring from creeping underground stems. Many people are acquainted with only one form of the plant and therefore do not realize that they are both poisonous.

Poison sumac (*Rhus vernix* L.) is a shrub, or sometimes a small tree, even more poisonous to the touch than poison ivy. It is not too common, found only in swamps and bogs. It is a relative of the other sumacs—staghorn and smooth. In poison sumac the stem, to which the seven to thirteen leaflets are attached, is round and not broad, and winged like that in dwarf sumac. In staghorn and the smooth sumac the leaflets are toothed, while in poison sumac there are no teeth.

Probably the most effective and safest way to eradicate these pests is by chemicals.

WEED SURVEY 1959

County farm agents throughout the State were asked to name the three worst weeds in their various counties. In reply they listed the three weeds in the order of their significance. Table I indicates the number one weeds in Pennsylvania.

Table I

Number One Weed in 1959

Name of Weed	*Counties*
Quackgrass	20
Wintercress	19
Canada thistle	10
Wild garlic	5
Crabgrass	3
Wild onion	2
Wild mustard	1
Common chickweed	1
Ragweed	1
Poison ivy	1
Foxtail	1

The following weeds were indicated as being number two and three choices: wild carrot, pigweeds, nut-grass, lamb's-quarter, curly dock, dandelion, mouse-ear chickweed, buckhorn plantain, Johnson grass, horse nettle, bindweed and burdock. Many other weeds were listed on the survey form as problems but not serious ones.

This type of survey indicates that a weed is not a serious problem in all parts of Pennsylvania. This is true, due to varied soil and climate conditions and to our diversified agriculture.

Acknowledgments: Figs. 19, 25, 30 ond 32 are fram "Weeds of Lawn and Gorden" by John M. Fogg, University of Pennsylvania Press; the remainder af the figures except Figs. 12 and 34 are from Bulletin 433, Representative Missouri Weeds ond their cantral, University of Missouri.

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